X-RAY ASTRONOMY 2019

X-RAY ASTRONOMY *2019*

Current Challenges and New Frontiers in the Next Decade

8-13 September 2019

CNR/INAF Research Area, Bologna, Italy

Report of Contributions

https://indico.ict.inaf.it/e/XRAY2019

Contribution ID: **2** Type: **Contributed**

Dissecting black hole-galaxy co-evolution from de-biased scaling relations

Thursday, September 12, 2019 9:15 AM (15 minutes)

It has been claimed for decades that almost all galaxies in the local Universe host at their centre a super-massive black hole (SMBH) the mass of which appears to be tightly correlated with the stellar mass and the random motion ("velocity dispersion", sigma) of the stars of the host galaxy. In this talk I will first highlight that significant biases affect local black hole-galaxy correlations. I will specifically show that the majority of quiescent early-type galaxies with central black hole mass estimates have significantly higher velocity dispersions than local unbiased galaxies of similar stellar mass. Through aimed Monte-Carlo simulations, residual analysis, and the comparison with latest AGN clustering measurements, I will then illustrate that present data sets of active and quiescent galaxies strongly favour on average lower SMBH masses than previously thought, and point to velocity dispersion as more "fundamental" than galaxy stellar mass, galaxy size or Sersic index. I will then move on discussing the main implications of these findings, in particular: 1) The implied black hole radiative efficiencies and obscured fractions; 2) the consequences on feedback from active black holes and SMBH binary gravitational waves; 3) the connection to cosmological models that rely on velocity dispersion, rather than stellar mass, as main driver of black hole growth.

Affiliation

University of Southampton

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr SHANKAR, Francesco (Southampton)

Presenter: Dr SHANKAR, Francesco (Southampton)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **3** Type: **Poster**

AstroSat observation of GX 5-1: Spectral and timing evolution

We report on the first analysis of AstroSat observation of the Z-source GX 5-1 on February 26-27, 2017. The hardness-intensity plot reveals that the source traced out the Horizontal and Normal branches. The 0.8-20 keV spectra from simultaneous SXT and LAXPC data at different locations of the hardness-intensity plot can be well described by a disk emission and a thermal Comptonized component. The ratio of the disk flux to the total i.e. the disk flux ratio increases monotonically along the horizontal to the Normal one. Thus, the difference between the Normal and Horizontal branches is that in the normal branch, the disk dominates the flux while in the horizontal one it is the Comptonized component which dominates. The disk flux scales with the inner disk temperature as T^5.5 and not as T^4 , suggesting that either the inner radii changes dramatically or that the disk is irradiated by the thermal component changing its hardness factor. The power spectra reveal a Quasi Periodic Oscillation whose frequency changes from ~ 30 Hz to 50 Hz. The frequency is found to correlate well with the disk flux ratio. In the 3-20 keV LAXPC band the r.m.s of the QPO increases with energy (r.m.s ∝ E^0.8), while the harder X-ray seems to lag the soft ones with a time-delay of a milliseconds. The results suggest that both the temporal and spectral properties of the source are determined by the geometry of the system which is characterized by the disk flux ratio and that the QPO has its origin in the corona producing the thermal Comptonized component.

Affiliation

Pacific Academy of Higher Education and Research University, Udaipur

Topic

Primary author: BHULLA, Yashpal (Pacific Academy of Higher Education and Research University, Udaipur)

Presenter: BHULLA, Yashpal (Pacific Academy of Higher Education and Research University, Udaipur)

Session Classification: POSTER SESSION

Contribution ID: **4** Type: **Poster**

XMM-Newton mission operations - preparing for the third decade

Friday, September 13, 2019 8:10 PM (2 minutes)

ESA's X-ray flagship the XMM-Newton space observatory is soon entering it's third decade of operations.
Both the spacecraft and the payload are operating without major degradation and scientific demand is continuously very high. Changing the on board Attitude and Orbit Control System Software in 2013 we managed to reduce the fuel consumption by a factor of two, additionally reducing stress on the reaction wheels. Currently the Flight Control team is preparing a new thermal operations strategy of the tank system to ensure that the saved fuel is available for continuous usage.
We will describe the status of implementation of the so called "fuel migration and replenishment" activities and make predictions how to operate the spacecraft with this concept potentially up to 2030+.
Furthermore we describe the overall health status of the mission, the need for evolution of the ground segment and concepts on streamlining mission operations with continued high safety requirements using automation tools to keep the science return at the highest possible levels.

Affiliation

ESA/ESOC

Topic

Primary author: KIRSCH, Marcus (ESA/ESOC)

Co-authors: Dr FINN, Timothy (Telespazio Vega); Mr V. KRUSENSTIERN, Nikolai (Telespazio Vega); Mr MAGUNIA, Arnfried (Terma); Mr MARTIN, Jim (ESA/ESOC); Mr PFEIL, Norbert (Terma); Mr SALT, David (Telespazio Vega); Mr WEBERT, Detlef (Telespazio Vega); Mr WEISSMANN, Uwe (Telespazio Vega); Mr TOMA, Liviu (Telespazio Vega); Mr BENSON, Ian (Serco)

Presenter: KIRSCH, Marcus (ESA/ESOC)

Session Classification: POSTER SESSION

Contribution ID: **6** Type: **Invited**

20 Years XMM-Newton: Scientific Achievements and Perspectives

Thursday, September 12, 2019 4:25 PM (25 minutes)

With about 350 refereed papers published each year, XMM-Newton is one of the most successful scientific missions of ESA ever. The talk summarizes the status of the mission and introduces the main performance indicators, which characterize the scientific impact of the mission. The talk gives then an overview of recent research highlights, which are indicative of the main developments of current X-ray astronomy.Finally, the talk outlines possible research and observational challenges for XMM-Newton in the next decade.

Affiliation

ESA / XMM-Newton

Topic

Primary author: SCHARTEL, Norbert (ESA - ESAC)

Presenter: SCHARTEL, Norbert (ESA - ESAC)

Session Classification: FUTURE MISSIONS

Contribution ID: **7** Type: **Poster**

X-ray emissions from magnetic polar regions of neutron stars

Friday, September 13, 2019 3:04 PM (2 minutes)

Structures of X-ray emitting magnetic polar regions on neutron stars in X-ray pulsars are studied. It is shown that a thin, optically thick, radiation energy dominated, X-ray emitting polar cone appears in each of the polar regions. The height of the polar cone from the neutron star surface to a standing shock at the top has a large dependence on the accretion rate. When $\dot{M} \simeq 10^{16}$ g s^{-1}, the height is a tenth as low as the neutron star radius. When $\dot{M} \simeq 10^{18}$ g s^{-1}, the height is, however, about 10 times as large as the neutron star radius. Histories of the radiation energy carried with the matter flowing in the polar cone also largely varies with the accretion rate. When $\dot{M}$ is as low as 10^{16} g s^{-1}, the energy is mostly radiated away behind the shock. However, when $\dot{M}$ is as large as 10^{18} g s^{-1} or larger, the energy gain due to the gravity of the neutron star exceeds the energy loss due to photon diffusion in the azimuthal direction of the cone, and a significant amount of energy is advected to the neutron star surface. Then, the radiation energy carried with the flow should accumulate there, and the radiation pressure should overcome the magnetic pressure which has been holding the flow within the cone. As a result, the matter should expand in the tangential direction along the neutron star surface, dragging the magnetic lines of force, and form a mound-like structure. The advected energy to the bottom of the cone should finally be radiated from the surface of the polar mound and the matter should be settled on the stellar surface there. From such configurations, we can expect an X-ray spectrum composed of a multi-color black-body spectrum from the polar cone region and a quasi-single black-body spectrum from the polar mound region. This spectral property agrees with observations. A fairly sharp pencil beam is expected together with a broad fan beam from the polar cone region, while a broad pencil beam from the polar mound region. With these X-ray beam properties, basic patterns in X-ray pulse profiles of X-ray pulsars can be explained too.

Affiliation

ISAS, JAXA

Topic

Primary author: Dr INOUE, Hajime (ISAS, JAXA)

Presenter: Dr INOUE, Hajime (ISAS, JAXA)

Session Classification: POSTER SESSION

Contribution ID: **8** Type: **Poster**

The X-ray view of the repeat changing-look AGN NGC 1566

Friday, September 13, 2019 6:26 PM (2 minutes)

NGC 1566 is one of only a handful of AGN that have undergone more than one changing-look event, having changed from Sy 1.9 to Seyfert 1.2 and at least five times. The most recent event was in 2018, where the source increased in X-ray flux by a factor of ~70 and nearly three magnitudes in the UV in under 9 months, coinciding with the reappearance of strong broad lines in the optical spectra.

For the first time, high quality X-ray spectra were taken at the peak of the outburst. The spectra show a classic Seyfert 1 X-ray spectrum, with a soft excess, compton hump, and iron line, as well as outflowing absorption in the high-resolution RGS spectrum. The remarkable speed with which this 'standard'AGN develops, and the repeating nature, offers a unique insight into the changing look phenomenon.

Affiliation

ESA/ESAC

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr PARKER, Michael (ESA/ESAC)

Co-authors: SCHARTEL, Norbert (ESA - ESAC); Dr GRUPE, Dirk; KOMOSSA, S. (MPIfR); Prof. HARRISON, Fiona; Prof. KOLLATSCHNY, Wolfram; Ms MIKULA, Rebecca; Dr SANTOS-LLEO, Maria; Ms TOMAS, Laura

Presenter: Dr PARKER, Michael (ESA/ESAC)

Session Classification: POSTER SESSION

Contribution ID: **9** Type: **Poster**

Comparison of spectral models for disc truncation in the hard state of GX 339-4

Friday, September 13, 2019 2:50 PM (2 minutes)

We probe models of disc truncation in the hard spectral state of an outburst of the X-ray transient GX 339-4. We test a large number of different models of disc reflection and its relativistic broadening, using two independent sets of codes. We apply it to a Rossi X-ray Timing Explorer spectrum in the rising part of the hard state. Our statistically best model has a physical thermal Comptonization primary continuum, requires the disc to be truncated at a radius larger than or equal to about two ISCO radii for the maximum dimensionless spin, and predicts a disc inclination in agreement with that of the binary. A paper presenting our results has been published in MNRAS (arXiv:1811.09145).

Affiliation

Nicolaus Copernicus Astronomical Center PAS

Topic

Primary author: Ms DZIEŁAK, Marta (Nicolaus Copernicus Astronomical Center PAS)

Co-authors: Prof. ZDZIARSKI, Andrzej (Nicolaus Copernicus Astronomical Center PAS); Dr SZANECKI, Michał (Nicolaus Copernicus Astronomical Center PAS); Dr DE MARCO, Barbara (Nicolaus Copernicus Astronomical Center PAS); NIEDŹWIECKI, Andrzej (Łódź University); MARKOWITZ, Alex (Nicolaus Copernicus Astronomical Center PAS, University of California)

Presenter: Ms DZIEŁAK, Marta (Nicolaus Copernicus Astronomical Center PAS)

Session Classification: POSTER SESSION

Contribution ID: **10** Type: **Poster**

Peculiar outbursts of an ultra luminous source likely signs of an aperiodic disc-wind

Friday, September 13, 2019 4:06 PM (2 minutes)

The ultra luminous X-ray source XMMU 122939.7+075333 is located in the metal rich globular cluster RZ 2109 in the massive Virgo elliptical galaxy NGC 4472 (M49). Previous studies showed that this ultra luminous source varies between bright and faint phases on timescales of just a few hours. Here, we present the discovery of two peculiar X-ray bursting events that last for about 8 and 3.5 hours separated by about 3 days. It is the first time that such a recurring X-ray burst-like behaviour has been observed. We show that type-I X-ray bursts or super bursts as well as outburst scenarios requiring a young stellar object are highly unlikely explanations for the observed light curve. Thus only an aperiodic disc-wind scenario driven by hyper-Eddington accretion remains as a viable explanation for this new type of X-ray flaring activities.

Affiliation

National Tsing Hua University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: STIELE, Holger

Co-author: Prof. KONG, Albert (National Tsing Hua University)

Presenter: STIELE, Holger

Session Classification: POSTER SESSION

Contribution ID: **11** Type: **Poster**

Variability studies of black hole X-ray binaries with NICER

Friday, September 13, 2019 4:04 PM (2 minutes)

NICER's X-ray Timing Instrument allows investigating short-term variability of compact objects in the soft (0.2-12 keV) X-ray band. We used publicly available NICER monitoring data of black hole X-ray binary candidates, to investigate their short-term variability and follow it throughout the outburst. Black hole X-ray binaries are known to show a certain variability feature, called quasi-periodic oscillation, which can occur in different flavours depending on the state the source is in. We compare our NICER results to those obtained from other X-ray instruments, present our findings on quasi-periodic oscillations and covariance spectra, and discuss implications.

Affiliation

National Tsing Hua University, Hsinchu

Topic

Primary author: STIELE, Holger

Co-author: Prof. KONG, Albert (National Tsing Hua University)

Presenter: STIELE, Holger

Session Classification: POSTER SESSION

Contribution ID: **14** Type: **Poster**

XMM-Newton Survey of Magellanic Bridge

Friday, September 13, 2019 3:15 PM (1 minute)

Along with available optical data of the Magellanic Bridge (the interconnecting region between the Small & Large Magellanic Cloud), we aim to characterise the X-ray binary population as a function of the local stellar population (in terms of age, metallicity, and stellar density) in the Bridge. Gardiner & Noguchi (1996) suggests that closest approach between Small & Large Magellanic Cloud, as evidenced by dramatic phase shift in star formation, occurred approximately ~200 Myr ago. During the approach, gas had been tidally stripped (most likely from the Small Magellanic Cloud) into the interconnecting Bridge. According to models of star formation history (Harris 2007), alongside optical surveys of the Bridge, there is strong evidence to suggest that the young, low metallicity stellar population formed in situ, rather than being tidally stripped from either Magellanic Cloud. Studying this region enables for a closer look at galaxy mergers, as well as how this environment (gas density, metallically) affects star formation. Thus the Magellanic Bridge gives us a window into galaxy interaction mechanics, as it contains resolvable X-ray and optical sources. X-ray data is obtained through the XMM-Newton from three separate fields, located near the Western Bridge, which coincides with available optical data. X-ray binary candidates will be followed up with spectroscopic analysis, using the 1.9m telescope located in Sutherland.

Affiliation

University of Cape Town

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Mr LE ROUX, Ryan (University of Cape Town)

Presenter: Mr LE ROUX, Ryan (University of Cape Town)

Session Classification: POSTER SESSION

Contribution ID: **15** Type: **Contributed**

Hot Gaseous Halos in Early Type Galaxies

Tuesday, September 10, 2019 5:55 PM (15 minutes)

The hot ISM in early type galaxies (ETGs) plays a crucial role in understanding their formation and evolution. The structural features of the hot gas identified by Chandra and XMM-Newton observations point to key evolutionary mechanisms, (e.g., AGN and stellar feedback, merging history). In our X-ray Galaxy Atlas project, we systematically analyzed the archival Chandra (XMM-Newton) data of 70 (50) ETGs and produced uniform data products with spatially resolved 2D spectral maps of the hot gas from individual galaxies. Utilizing our data products, we will discuss the hot gas morphology in relation to AGN/stellar feedback and environmental effects; the hot gas global properties and scaling relations; and the possibility of the universal T profile in ETGs.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Hot and diffuse baryons

Primary author: KIM, Dong-Woo (Center for Astrophysics | Harvard & Smithsonian)

Presenter: KIM, Dong-Woo (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **16** Type: **Poster**

Hot gas heating via magnetic arms in spiral galaxies?

Friday, September 13, 2019 2:52 PM (2 minutes)

In some spiral galaxies the so-called “magnetic arms” have been reported, being interarm areas with significant polarized radio emission that suggests high ordering of the magnetic field. The most prominent example of such a galaxy is NGC 6946.
The nature of these magnetic features is still under debate. One of the possible explanations is the action of reconnection heating that could convert the energy of the magnetic field into thermal energy of the surrounding gas.
We summarize the analysis of the radio and X-ray emission (measured with XMM-Newton) from NGC 6946 and conclude that we might see hints for such reconnection heating (cf. Wezgowiec et al. A&A 585, 3, 2016). A similar analysis is on-going for further galaxies: For one of them, M83, we intend to present preliminary results.

Affiliation

ESA-ESAC

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Dr EHLE, Matthias (ESA-ESAC); Dr WEZGOWIEC, Marek (Obserwatorium Astronomiczne Uniwersytetu Jagiellonskiego, Krakow)

Co-authors: Dr BECK, Rainer (MPIfR Bonn); Dr SOIDA, Marian (Obserwatorium Astronomiczne Uniwersytetu Jagiellonskiego, Krakow); Dr URBANIK, Marek (Obserwatorium Astronomiczne Uniwersytetu Jagiellonskiego, Krakow)

Presenter: Dr EHLE, Matthias (ESA-ESAC)

Session Classification: POSTER SESSION

Contribution ID: **17** Type: **Poster**

New outburst with periodic modulation for a luminous supersoft source in NGC 300.

Friday, September 13, 2019 2:44 PM (2 minutes)

Supersoft X-ray sources are characterized by black body temperatures below 100 eV and are found with luminosities that are explained by steady nuclear burning of hydrogen accreted onto white dwarf surfaces (in the range of $10^{36} - 2 \times 10^{38}$ erg/s) or are ultraluminous (>2×10^{38} erg/s) requiring the
presence of a neutron star or black hole. We report the discovery of a new outburst for the luminous supersoft source, SSS_1, in NGC 300, thanks to a very long XMM-Newton observation performed on the 17-20 December 2016. A modulation with a period of 4.68±0.26 h is detected which is still compatible with a period measured in 2000 (5.7h±1.1h), affected by large uncertainties. Depending on the spectral model the bolometric luminosity is superior or equal to 3×10^{38} erg/s and is marginally consistent with a 1.4 $M_\odot$ white dwarf accreting at Eddington luminosities. The system was found in outburst in 2016, 2008, 2000 and 1992, suggesting a possible recurrence period of about 8 years.

Affiliation

Max Planck Institute for Extraterrestrial Physics

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Dr CARPANO, Stefania (Max Planck Institute for extraterrestrial Physics); Dr HABERL, Frank (MPE-MPG); Dr MAITRA, Chandreyee (MPE-MPG)

Presenter: Dr CARPANO, Stefania (Max Planck Institute for extraterrestrial Physics)

Session Classification: POSTER SESSION

Contribution ID: **19** Type: **Contributed**

MAPPING THE OUTER REGIONS OF HIGH-Z CLUSTERS COMBINING X-RAY AND SZ OBSERVATIONS

Tuesday, September 10, 2019 6:10 PM (15 minutes)

Galaxy cluster are the largest bound structures in the Universe. The formed recently, at z~2, and since then they have been growing through accretion of matter from the cosmic web in their outskirts. X-ray follow up observations of SZ selected clusters offer a unique opportunity to study the faint outskirts of these objects. The South Pole Telescope (SPT) 2500d survey detected hundreds of clusters, spanning object in the local Universe up to redshift of 1.8, allowing to characterize the formation and evolution with cosmic time of the most massive structures in the Universe.
In our work, we combine deep Chandra and XMM-Newton observations for a sample of 7 mass selected SPT clusters at redshift above 1.2, to measure the thermodynamic profiles, constraining how the cluster properties evolve with cosmic time.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Hot and diffuse baryons

Primary author: GHIRARDINI, Vittorio (Center for Astrophysics | Harvard & Smithsonian)

Presenter: GHIRARDINI, Vittorio (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **20** Type: **Contributed**

Searching for high-z AGN with Chandra and with future facilities

Thursday, September 12, 2019 3:00 PM (15 minutes)

Chandra and XMM-Newton showed that AGN existed in the early Universe (at z~7.5) and this challenges our understanding of SMBH formation. Chandra detected serendipitously only an handful of z>4-5 sources and the majority of the constrains on the nature of early Black holes come from Cosmic background fluctuations studies or stacking/follow up of Infrared selected sources. I will present recent results constraining the nature of SMBH seeds using cosmic background fluctuations and Chandra surveys. These studies led to the serendipitous discovery of a previously unknown, X-ray emitting component of the ISM. Finally, in this talk I will present strategies and plans to detects SMBHs in the early universe with Athena, Lynx or AXIS.

Affiliation

University of Miami

Topic

The cosmic frontier: first black holes and proto-clusters

Primary author: CAPPELLUTI, Nico (University of Miami)

Presenter: CAPPELLUTI, Nico (University of Miami)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **21** Type: **Poster**

X-ray polarimetry of extended sources with IXPE

Friday, September 13, 2019 8:08 PM (2 minutes)

The launch of the NASA/ASI Imaging X-ray Polarimetry Explorer (IXPE) mission in Spring 2021 will open a new era of X-ray polarimetry, thanks to the imaging and polarimetric capabilities of the Gas Pixel Detectors.

The unique combination of imaging and polarimetric capabilities over the wide Field of View (8 arcmin) will allow IXPE to investigate the polarimetric properties of complex fields and extended sources. These targets will be studied by means of position- and energy-dependent polarization maps that will clarify the emission processes and the role of the magnetic field structure on the cceleration process in the X-ray emitting region.

Here I will review the state of the art of the expected IXPE performance for the study of extended sources, discussing the results of simulations of the observation of representative targets such as the relativistic Jet of Centaurus A, the Tycho Supernova remnant and the Molecular Clouds in the Galactic center.

Affiliation

INAF-IAPS

Topic

Future missions

Primary author: FERRAZZOLI, Riccardo (Istituto Nazionale di Astrofisica (INAF))

Presenter: FERRAZZOLI, Riccardo (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **22** Type: **Poster**

The SXPS catalogues: improved transient detection with Swift-XRT

Friday, September 13, 2019 2:06 PM (2 minutes)

The study of transient phenomena has entered a new phase with the advent of multi-messenger astronomy, as we now routinely search large areas of sky for an electromagnetic counterpart to a neutrino or gravitational wave trigger. This presents various new challenges. We need to understand the probability of serendipitously observing an X-ray transient during such follow up. We also need fast, reliable techniques to search a large sky area for transients, with a low rate of spurious detections, and ideally with a high level of completeness. However, it is often not easy to distinguish a transient source from a persistent but uncatalogued object.

In this talk I will address these questions using the revised Swift-XRT Point Source catalogues. I will summarise new techniques developed for reducing spurious detections due to artifacts such as stray light – which is of particular importance for other missions, especially Athena. I will also introduce the forthcoming "Live" SXPS catalogue and transient detector. This system will offer near real-time analysis of XRT data, including a constantly-updated upper limit calculator, and a real-time transient search algorithm. I will briefly highlight the transferability of these algorithms to missions such as THESEUS and Athena.

Affiliation

University of Leicester

Topic

Multi-messenger and transient astronomy

Primary author: Dr EVANS, Phil (University of Leicester)

Presenter: Dr EVANS, Phil (University of Leicester)

Session Classification: POSTER SESSION

Contribution ID: **24** Type: **Poster**

Integration facility for the ATHENA X-ray telescope

Friday, September 13, 2019 8:26 PM (2 minutes)

The optics of ATHENA (Advanced Telescope for High-ENergy Astrophysics) –the next high-energy astrophysical mission of the European Space Agency –consists of 678 Silicon Pore Optics mirror modules integrated and co-aligned onto a common supporting structure. The integration process, already proved, exploits an optical bench to capture the focal plane image of each mirror module when illuminated by an ultra-violet plane wave at 218 nm. Each mirror module focuses the collimated beam onto a CCD camera placed at the 12 m focal position of the ATHENA telescope and the acquired point spread function is processed in real time to calculate the centroid position and intensity parameters. This information is used to guide the robot-assisted alignment sequence of the mirror modules.
To implement the above process to the entire ATHENA optics, a dedicated vertical optical bench is being designed. The facility consists of a paraboloid mirror that collects the light from an ultraviolet point source and generates a single reference plane wave large enough to illuminate the 2.6 m aperture of the X-ray telescope; a 15 m tall tower supports the CCD camera at the focal plane position, where the light from each mirror module is focused. The facility must also allow an alignment accuracy of 1 arcsec for the integration of two mirror modules per day in any arbitrary integration sequence, including the option of removing, re-aligning, or replacing any mirror module.
The detailed design of optical bench and the status of the construction activities will be presented at the conference.

Affiliation

Media Lario

Topic

Future missions

Primary authors: VALSECCHI, Giuseppe (Media Lario); ZOCCHI, Fabio (Media Lario); MARIONI, Fabio (Media Lario); BIANUCCI, Giovanni (Media Lario); BAVDAZ, Marcos (ESA); FERREIRA, Ivo (ESA); WILLE, Eric (ESA); KORHONEN, Tapio (Opteon); PARESCHI, Giovanni (INAF OAB)

Presenter: VALSECCHI, Giuseppe (Media Lario)

Session Classification: POSTER SESSION

Contribution ID: **27** Type: **Contributed**

Searching for the hot and diffuse baryons in the Universe via surface brightness fluctuations of cosmic X-ray background

Wednesday, September 11, 2019 9:55 AM (15 minutes)

Surface brightness fluctuation analysis has become a new frontier in studying cosmic X-ray background (CXB) due its ability to disentangle contributions of different CXB components via their different angular correlation properties and energy spectra. This analysis can be utilized to search for contribution of low surface brightness objects, such as faint and distant cluster of galaxies and the warm-hot intergalactic medium (WHIM), as fluctuation studies with *Chandra* surveys have demonstrated. Such an approach complements and contrasts the more established approach relying on making an inventory of individual objects in deep X-ray surveys.
Thanks to its large effective area and significant investment of observing time made in wide-angle surveys, *XMM-Newton* is well placed for searches of hot and diffuse baryons in the Universe via CXB fluctuation analysis. However, its complex and varying instrumental background has been impeding such searches. In this talk we present results of a first CXB surface brightness fluctuation study with *XMM-Newton* data of the XXL fields. These data permitted us to obtain the most accurate power spectrum measurement of CXB fluctuations on the angular scales from ∼4 arcsec to ∼6 degrees to date. We will also present the energy spectra of CXB fluctuations at different angular scales which may hold the key to a possible detection of the WHIM. These results are an important milestone for CXB fluctuation studies with future, larger *XMM-Newton* surveys and with the upcoming *SRG/eROSITA* all-sky survey (eRASS), and cross-correlation studies with SZ data from Planck, ACT and SPT.

Affiliation

Institut d'Astrophysique Spatiale, CNRS/Universite Paris-Sud, Orsay, France

Topic

Hot and diffuse baryons

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Presenter: Dr KOLODZIG, Alexander (Institut d'Astrophysique Spatiale, CNRS/Université Paris-Sud, France)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **28** Type: **Contributed**

X-ray obscurers: bridging the gap between warm absorbers and ultra-fast outflows

Wednesday, September 11, 2019 11:25 AM (15 minutes)

Outflows from active galactic nuclei are found over a broad range of distances from the supermassive black hole and with a large range of velocities. The so-called "warm absorbers" cover a broad range of ionization parameters but at modest velocities of a few hundred to thousand km/s and relatively modest column densities of typically less than 1% of the Thomson depth. On the other extreme, ultra-fast outflows with speeds of order 0.1c have column densities up to a Thomson depth but are almost fully ionized. In this contribution, we discuss a newly discovered component, the X-ray obscurers which occupy the velocity gap and likely also the distance gap between warm absorbers and ultra-fast outflows. These obscurers have been studied in detail using deep joint monitoring observations with XMM-Newton, HST, Swift and NuSTAR in for example NGC 5548 and NGC 3783. The gas is generally lowly ionized, has high column densities up to 10% of the Thomson depth and is outflowing at speeds of several thousands of km/s. They block a significant fraction of the ionizing radiation from the central regions, are likely due to a strong accretion disk wind, and occur more frequently than previously anticipated. We discuss the impact of these obscurers on their environment, their frequency and the observational challenges to study them.

Affiliation

SRON

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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Presenter: KAASTRA, Jelle (SRON)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **29** Type: **Poster**

Timing and Spectral Analysis of Black Hole Candidate X-Ray Binary MAXI J1535-571 from NICER Observations

Friday, September 13, 2019 3:40 PM (1 minute)

This Bachelor's Thesis is mainly focused on Neutron Star Inner Composition ExploreR(NICER) Observations of MAXI(The Monitor of All-Sky X-Ray Image) J1535-571, a Galactic Black Hole Candidate with an accompanying Star. Research conducted by J.M. Miller et al. 2018 and A. L. Stevens et al. 2018 were followed in order to acquire similar results, that is; confirming the existence of relativistic accretion disk reflection and line broadening at the Fe K line. This line broadening effect allowed the spin parameter(a) value to be measured as a=0.998(5). Fitting results of the models used during the spectral fitting indicate that the disk of MAXI J1535-571 may be warped.

Afterwards, the timing of the source from 3 NICER Observations was made and three power spectra that indicate the existence of one peak which resembles Quasi Periodic Oscillation(QPO) of the source around 6 Hz on the power density spectra were acquired. Results also indicate that this QPO seems to be shifting in frequency as time passes.

Affiliation

Middle East Technical University Department of Physics

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Mr ÖZÜDOĞRU, Özgür Can (Middle East Technical University Department of Physics)

Presenter: Mr ÖZÜDOĞRU, Özgür Can (Middle East Technical University Department of Physics)

Session Classification: POSTER SESSION

Contribution ID: **31** Type: **Poster**

Dissecting the chemical properties of the ICM in massive galaxy clusters

Friday, September 13, 2019 4:38 PM (2 minutes)

We investigate the spatial distribution of iron in the intracluster medium (ICM) of massive clusters at different cosmic epoch, focusing on two distinct components: a central peaked distribution, and a wider, flatter component. Thanks to the angular resolution of Chandra data, we are able to follow the increase in the size of the central component, which, however, does not grow significantly in mass in the range 0<z<1. This behavior is consistent with an early production of the bulk of the metals at z»1, and a slow diffusion process possibly driven by the mechanical-mode feedback from the central galaxy. On the other hand, the flatter and wider component includes the majority of the metal mass and has a much slower evolution with epoch. We recast the evolution of iron in terms of total iron mass within a given radius in each component, and attempt to constrain the enrichment mechanisms and the associated time scales. As a byproduct of the high spatial resolution analysis of iron distribution, we are also able to investigate the origin of the "central iron drop", a small-scale decrement observed at the center of the iron peak in some clusters. We find that although the iron drop is mostly due to a mechanical process removing the highly enriched ICM from the center, it should also be ascribed partially to iron depletion onto dust grains, consistent with the most recent scenario of the baryon cycle in cool-core clusters.

Affiliation

INAF Arcetri Astrophysical Observatory; Sapienza University of Rome; University of Rome Tor Vergata

Topic

Hot and diffuse baryons

Primary author: LIU, Ang (INAF Arcetri Astrophysical Observatory; Sapienza University of Rome; University of Rome Tor Vergata)

Co-authors: TOZZI, Paolo (Istituto Nazionale di Astrofisica (INAF)); Dr ETTORI, Stefano; Dr DE GRANDI, Sabrina

Presenter: LIU, Ang (INAF Arcetri Astrophysical Observatory; Sapienza University of Rome; University of Rome Tor Vergata)

Session Classification: POSTER SESSION

Contribution ID: **34** Type: **Poster**

A multi-observatory X-ray approach to characterize heavily obscured AGN

Friday, September 13, 2019 6:02 PM (2 minutes)

According to the different models of Cosmic X-ray Background (CXB), the diffuse X-ray emission observed in the 1 to ~200-300 keV band, is mainly caused by accreting supermassive black holes, the so-called active Galactic Nuclei (AGN). Particularly, at the peak of the CXB (~30 keV) a significant fraction of emission (10-25%) is expected to be produced by a numerous population of heavily obscured, Compton thick (CT-) AGN, having intrinsic column density NH>=1E24 cm^(-2). Nonetheless, in the nearby Universe (z<=0.1) the observed fraction of CT-AGN with respect to the total population appears to be lower than the one expected on the basis of the majority of CXB model predictions (~20-50%), being between 5 and 10%. This discrepancy between data and models is one of the open challenges for X-ray astronomers, and needs to be solved to get a complete understanding of the AGN population.
In this presentation, I will discuss a multi-observatory X-ray approach to find and characterize heavily obscured AGNs. The starting point of the project is the 100-month Swift-BAT catalog, the result of a ~7 years all-sky survey in the 15-150 keV band and a powerful tool to select and identify nearby, heavily obscured AGNs.. These objects are then targeted with snapshot (5-10 ks) observations with Chandra and Swift-XRT, which allow us to constrain the intrinsic absorption value within a 20-30% uncertainty. Finally, deep (25-50 ks) observations with XMM-Newton and NuSTAR allow us to study the physics of these complex and elusive sources.

Affiliation

Clemson University/INAF OAS Bologna

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: MARCHESI, Stefano (Clemson University); Prof. AJELLO, Marco (Clemson University); Mr ZHAO, Xiurui (Clemson University)

Presenter: MARCHESI, Stefano (Clemson University)

Session Classification: POSTER SESSION

Contribution ID: **36** Type: **Poster**

A Catalogue of XMM-Newton BL Lacs

Friday, September 13, 2019 5:00 PM (2 minutes)

A {\it XMM-Newton} catalogue of BL Lac X-ray properties is presented based on the cross-correlation with the 1374 BL Lacs listed in the 13th edition of the V\'{e}ron-Cetty and V\'{e}ron (2010) catalogue. {X-ray counterparts to these objects are searched in the field of view of around 10000 {\it XMM-Newton} pointed observations. The cross-correlation yielded a total of 352 {\it XMM-Newton} observations which corresponds to 102 different sources. Data from the three EPIC cameras and OM were homogeneously analysed using the {\it XMM-Newton} SAS software. Images, lightcurves and spectral products are produced for those BL Lacs detected in any of the three EPIC cameras. Two different phenomenological models, with different variations of the absorbing column density, are tested: Log-Parabolic and Powerlaw. We determine the best fit model and extract its parameters, The results of the analysis are presented as a catalogue of X-ray spectral properties of the sample in the 0.2 - 10 keV energy band as well as in the V/UV band. Multiwavelength information at radio and gamma-ray energies complete the catalogue.

Affiliation

European Space Agency

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr ÁLVAREZ CRESPO, Nuria (ESA)

Co-authors: Ms RACERO, Elena (ESA); Dr LOISEAU, Nora (ESA); Ms ROUCO ESCORIAL, Alicia (University of Amsterdam); Dr DE LA CALLE PÉREZ, Ignacio (ESA)

Presenter: Dr ÁLVAREZ CRESPO, Nuria (ESA)

Session Classification: POSTER SESSION

Contribution ID: **38** Type: **Poster**

The evolution of XLF of Brightest Cluster Galaxies

Friday, September 13, 2019 6:50 PM (2 minutes)

We present a systematic study of the nuclear X-ray luminosity function (XLF) of Brightest Cluster Galaxies (BCGs) for a wide range of halo masses, exploiting the entire Chandra archive (~600 BCGs). Thanks to the ~1 arcsec angular resolution, we are able to trace their radiatively-efficient nuclear activity through cosmic epochs from z=0.1 to z~>1, and to investigate the properties of the surrounding ICM. This work complements the measurement or radio emission of BCGs in the studies of feedback mechanisms across cosmic epochs in massive galaxy clusters, showing an increase in the feedback intensity with redshift, and, possibly, a switch in the feedback mode from mechanical to radiative. Our final goal is to constrain the cycle of hot and cold baryons in the core of groups and clusters of galaxies, including the origin of the feeding gas, the accretion regime, and the effects of feedback onto the surrounding ICM and on the star formation in the BCGs.

Affiliation

INAF - Osservatorio Astrofisico di Arcetri

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: TOZZI, Paolo (Istituto Nazionale di Astrofisica (INAF))

Presenter: TOZZI, Paolo (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **39** Type: **Contributed**

Evidence for radiation pressure compression in the X-ray narrow-line region of Seyfert galaxies

Wednesday, September 11, 2019 11:40 AM (15 minutes)

The observed overlap between soft X-ray emission and the NLR in obscured AGN is commonly interpreted as evidence for a constant gas pressure multiphase medium. Radiation pressure compression (RPC) also leads to a density distribution, since a gas pressure (hence density) gradient must arise within each cloud to counteract the ionizing radiation pressure. RPC leads to a well-defined ionization distribution, and a differential emission measure (DEM) distribution with a universal slope of -0.9. In contrast, a multiphase medium does not predict the form of the DEM. The observed DEMs of obscured AGN with XMM-Newton RGS spectra (the CHRESOS sample) are in striking agreement with the predicted RPC DEM, providing a clear signature that RPC is the dominant mechanism in the X-ray NLR. In contrast with the constant gas pressure multiphase medium, RPC further predicts an increasing gas pressure with decreasing ionization, which can be tested with future X-ray missions using density diagnostics.

Affiliation

Università degli Studi Roma Tre

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Prof. BIANCHI, Stefano (Università degli Studi Roma Tre)

Presenter: Prof. BIANCHI, Stefano (Università degli Studi Roma Tre)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **41** Type: **Contributed**

Supernovae-driven Galactic Outflows and the X-ray Emission and Absorption of Hot Circumgalactic Medium

Wednesday, September 11, 2019 9:40 AM (15 minutes)

The missing baryon and missing metals problems are the two major challenges for galaxy formation. The missing matter most likely resides in the warm-hot (10^{5-7} K) medium beyond galaxies. Hot outflows driven by supernovae carry the majority of energy and metals, providing a natural solution to these problems. X-ray emission from hot corona around spiral galaxies, observed by XMM-Newton and Chandra, provides critical information about the outflows and its interaction with the pre-existing gas. We use 3D galactic scale simulations to investigate this interaction, using physical outflow models calibrated by small-box, high-resolution simulations. We construct mock X-ray emission maps and absorption maps of galaxy coronae. I will talk about how the X-ray luminosity and its spatial distribution are related to the star formation activities in the galaxies, and in particular, how the simulated maps compared to the current observations. With a robust feedback model and current observational constraints, we predict emission and linewidths of hot gas further away from galaxies. This can be detected by future missions like ATHENA and HUBS with unprecedented sensitivities and spectral resolutions.

Affiliation

Center for Computational Astrophysics, Flatiron Institute

Topic

Hot and diffuse baryons

Primary authors: Dr LI, Miao (Center for Computational Astrophysics, Flatiron Institute); Dr STEPHANIE, Tonnesen (CCA, Flatiron Institute)

Presenter: Dr LI, Miao (Center for Computational Astrophysics, Flatiron Institute)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **42** Type: **Poster**

Understanding super-Eddington accretion through winds in ultraluminous X-ray sources

Friday, September 13, 2019 3:44 PM (1 minute)

Among the most important and debatable problems in astrophysics and cosmology is the formation of supermassive black holes. The detection of fully-grown supermassive black holes in active galactic nuclei at high redshift, when the Universe was young, challenges the theories of black holes growth, requiring long periods of high accretion, most likely above the Eddington limit. This is a focus of the next generation large missions, such as JWST and ATHENA, but the most distant supermassive black holes will be difficult to probe even with these advanced observatories. Ultraluminous X-ray sources (ULXs) are bright objects with X-ray luminosities between 10^{39-41} erg/s and can be found in nearby galaxies. Today we know that the vast majority of this complex class consists of stellar-mass black holes or neutron stars accreting at or above the Eddington limit. This was made possible by the discovery of coherent pulsations and cyclotron lines in some ULXs, indicating that at least a fraction of them hosts neutron stars as compact objects and, finally, the discovery of powerful winds as predicted by theoretical models of super-Eddington accreting black holes and neutron stars. In particular, the presence of both pulsations and winds in a pulsating ULX supports the existence of hybrid configurations where thick disks and radiatively-driven winds survive despite the opponent strong magnetic pressure. ULX winds carry a huge amount of power owing to their mildly relativistic speeds (~0.2c) and are able to significantly affect the surrounding medium such as regulating the ionization state and brightness of ULX super bubbles. The winds substantially limit the amount of matter that can reach the central accretor, which slows down its growth and extends its lifetime - in the case of an accreting neutron star. The study of ULX winds is therefore quintessential to understand 1) how much and how fast can matter be accreted by black holes and 2) how strong is their feedback onto the surrounding medium in the regime of high accretion rate such as for quasars and supermassive black holes at their peak of growth. In this talk I will provide an overview on this vast phenomenology and its state-of-art, focusing on recent discoveries of outflows in ULXs and their characteristics.

Affiliation

European Space Agency

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr PINTO, Ciro (European Space Agency)

Co-authors: Mr KOSEC, Peter (University of Cambridge); Dr WALTON, Dom (University of Cambridge); Dr MIDDLETON, Matthew (University of Southampton); Dr SORIA, Roberto (University of the Chinese Academy of Sciences); Prof. ROBERTS, Tim (University of Durham); Prof. FABIAN, Andy (University of Cambridge); Dr GUAINAZZI, Matteo (European Space Agency); Dr MEHDIPOUR, Missagh (Netherlands Institute for Space Research); Dr NESS, Jan-Uwe (European Space Agency)

Presenter: Dr PINTO, Ciro (European Space Agency)

Session Classification: POSTER SESSION

Contribution ID: **43** Type: **Contributed**

Understanding AGN feedback with XRISM and ATHENA

Friday, September 13, 2019 10:20 AM (15 minutes)

There is strong evidence for a link between the growth of supermassive black holes (SMBHs) and their host galaxies. Active galactic nuclei (AGN) powered by accretion onto SMBHs release a huge amount of energy in the surrounding medium in the form of radiation, winds and jets. This phenomenon also known as AGN feedback has been invoked to regulate the growth of SMBHs and their host galaxies as well as to establish a balance between cooling and heating in the extragalactic intracluster medium. This corresponds to two modes of AGN feedback that operate at different regimes of accretion onto the black hole (radiative mode at high and kinetic mode at low Eddington rates, respectively) and are thought to remove and heat the gas which otherwise would cool down and form new stars as well as feeding the SMBH. There has been significant progress in this field, particularly thanks to the contribution of X-ray missions such as XMM-Newton, Chandra, Suzaku and - despite its brief life - Hitomi, but still many crucial questions remain unanswered. What are the duty cycles of AGN winds? Can we distinguish between magnetic and radiation launching mechanisms? Can we estimate the net accretion rate onto the SMBH? How fast can black holes accrete matter? What are the exact means by which energy is released and propagated throughout the surrounding medium? In this talk I will show how we can tackle these unknowns through the new X-ray missions XRISM and ATHENA, focussing on the corresponding mission requirements.

Affiliation

European Space Agency

Topic

Future missions

Primary author: Dr PINTO, Ciro (European Space Agency)

Co-authors: Prof. FABIAN, Andy (University of Cambridge); Dr GUAINAZZI, Matteo (European Space Agency); Dr SANDERS, Jeremy (MPE, Garching, Germany); Mr BAMBIC, Chris (University of Cambridge); Mr LIU, Haonan (University Of Cambridge); Prof. CHRIS, Reynolds (University of Cambridge)

Presenter: Dr PINTO, Ciro (European Space Agency)

Session Classification: FUTURE MISSIONS

Contribution ID: **44** Type: **Poster**

Study of high redshift X-ray sources through an analysis of the deepest X-ray field observed by XMM-Newton

Friday, September 13, 2019 5:22 PM (2 minutes)

This work presents preliminary results of the survey carried out on one of the deepest X-ray field observed by the XMM Newton satellite. The survey is made by 13 observations taken over 2 years with a total exposure time of 1.6 Ms over a field of 30 × 30 □□□□□□2 around the blazar 1ES 1553+113, which were originally addressed to the study of the Warm Hot Intergalactic Medium (Nicastro et al. 2018). We detect 472 X-ray sources with high likelihood (> 6). Preliminary properties (e.g. positions, fluxes at different bands, hardness ratios) are obtained. The X-ray source list was cross correlated with the source list obtained by the observation of the Gran Telescopio Canarias (GTC) over the same field in g,r,i, z bands. Thanks to the availability of photometric redshift, we obtain a sublist of AGNs candidates and their X-ray luminosities, their large scale distribution and the luminosity function as an indicator of the evolution of Supermassive Black Holes at high redshift. Perspective for the study of the X-ray Background (XRB) and Hard X-ray emitting Active Galactic Nuclei and of high redshift Quasars will be included

Affiliation

National Institute of Astrophysics, Optics and Electronics (INAOE)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Mr ELÍAS CHÁVEZ, Mauricio (National Institute of Astrophysics, Optics and Electronics (INAOE)); Dr LONGINOTTI, Anna Lia (INAOE); Dr KRONGOL , Yair (UNAM)

Presenter: Mr ELÍAS CHÁVEZ, Mauricio (National Institute of Astrophysics, Optics and Electronics (INAOE))

Session Classification: POSTER SESSION

Contribution ID: **45** Type: **Poster**

The origin of UFOs in AGN

Friday, September 13, 2019 6:18 PM (2 minutes)

UltraFast Outflows (UFO) are seen in some active galactic nuclei (AGNs), with blueshifted absorption lines of highly ionised iron ion. AGN typically has a UV-bright accretion flow, so UV line driving is an obvious candidate for launching these winds. However, it requires that material in the acceleration zone has substantial UV opacity, in conflict with the observed very high ionisation state of the wind. We use a state of the art UV line driven wind simulation (full radiation hydrodynamics), and demonstrate that there are some lines of sight which only intercept fast and highly ionised material. The cooler material required for the acceleration is out of the line of sight, close to the disc, shielded from the X-rays by a failed wind. We show that resonance line scattering in the wind can reproduce the broad Fe-K feature seen in the lag-energy spectra. New data from the microcalorimeters will allow us to test this, paving the way for a physical model of the mass loss rate of UFOs.

Affiliation

University of Durham

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: MIZUMOTO, Misaki (University of Durham)

Presenter: MIZUMOTO, Misaki (University of Durham)

Session Classification: POSTER SESSION

Contribution ID: **46** Type: **Contributed**

Searching for sub-pc supermassive black hole binary candidates in the hard X-rays

Monday, September 9, 2019 12:30 PM (15 minutes)

Supermassive black hole binaries (SMBHB) are a natural outcome of the hierarchical mergers predicted by the ΛCDM cosmology, and promising sources of nanohertz continuous gravitational wave signals. However, their detection remains elusive. Since hard X-rays are produced in the innermost regions of active galactic nuclei, they are predicted to show the best signatures of SMBHB, namely a double-peaked iron emission line and a periodic light curve (Sesana et al. 2012). I will present new results of a search for SMBHB candidates based on the analysis of decade-long Swift-BAT hard X-ray ($E = 14 - 195$ keV) light curves. A power spectrum-based pipeline that takes colored noise into account was applied on the whole catalog, and the most significant candidates for periodic light curves are here presented.
Particularly, we focused on the Seyfert 2 galaxy MCG+11-11-032, because evidence for a double-peaked profile of the Fe Kα line was recently reported (Severgnini et al. 2018). We identified a significant ($\sim 4\sigma$) power spectrum peak in the Swift-BAT hard X-ray light curve, at frequency $f_0 = 15 \pm 2$ nHz, i.e. $P_0 = 26 \pm 4$ months. This value is consistent with the hypothesis of a sub-pc scale SMBHB, already suggested in Severgnini et al. (2018). These new results confirm that MCG+11-11-032 may host one of the most promising SMBHB candidates to date.

Affiliation

INAF - Osservatorio Astronomico di Brera

Topic

Multi-messenger and transient astronomy

Primary author: SERAFINELLI, Roberto (Istituto Nazionale di Astrofisica (INAF))

Co-authors: SEVERGNINI, Paola (Istituto Nazionale di Astrofisica (INAF)); CICONE, Claudia (Istituto Nazionale di Astrofisica (INAF)); BRAITO, Valentina; DELLA CECA, Roberto (Istituto Nazionale di Astrofisica (INAF)); Prof. VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); Dr AMBROSINO, Filippo (INAF - Istituto di Astrofisica e Planetologia Spaziali); DOTTI, Massimo (Universita‘ di Milano Bicocca); Prof. SESANA, Alberto (Universita‘ di Milano Bicocca); BALLO, Lucia; LA PAROLA, Valentina (Istituto Nazionale di Astrofisica (INAF)); MATZEU, Gabriele (European Space Agency/European Space Astronomy Centre); ZAINO, Alessandra (Roma Tre University)

Presenter: SERAFINELLI, Roberto (Istituto Nazionale di Astrofisica (INAF))

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **47** Type: **Poster**

Spectral atlas of the XMM-CDFS deep survey

Friday, September 13, 2019 5:48 PM (2 minutes)

XMM-Newton observed the Chandra Deep Field South (CDFS) with a ~3 Ms exposure time. EPIC spectra of bright 185 sources, practically all AGN with redshift up to z=3.8 , are compiled and their basic properties are studied by conventional spectral fitting, as well as an exploratory analysis with two, rest-frame X-ray colours and the Fe K line strength indicator and rest-frame spectral stacking. A significant proportion of the sample shows X-ray absorption, as expected. The nH distribution agrees with that has been found in various X-ray surveys. We find a Compton thick AGN fraction to be ~4%. Obscured AGN fraction shows a clear evolution and we attribute it to increasing gas content in galaxies towards high redshift. For unobscured AGN, broad Fe K line detection rate is ~30% in the brightest 21 subsample. The anti-correlation between the narrow Fe K EW and Lx (or the Iwasawa-Taniguchi effect) found in nearby AGN is not present in the XMM-CDFS unobscured AGN. However, this is probably due to a combination of the Lx-z bias and the evolution of the galaxy gas content suggested above.

Affiliation

ICREA and Universitat de Barcelona

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: IWASAWA, Kazushi (ICREA and Universitat de Barcelona); COMASTRI, Andrea (Istituto Nazionale di Astrofisica (INAF)); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); GILLI, Roberto (Istituto Nazionale di Astrofisica (INAF)); LANZUISI, Giorgio (1) DIFA Università di Bologna, 2) OAS-INAF); Prof. BRANDT, Niel (Penn State University); BRUSA, Marcella (Istituto Nazionale di Astrofisica (INAF)); Dr GEORGANTOPOULOS, Ioannis (Athen Observatory); Dr MAINIERI, Vincenzo (ESO); Dr PUCCETTI, Simonetta (ASI); TOZZI, Paolo (Istituto Nazionale di Astrofisica (INAF)); Dr RANALLI, Piero (Combient MiX AB)

Presenter: IWASAWA, Kazushi (ICREA and Universitat de Barcelona)

Session Classification: POSTER SESSION

Contribution ID: **48** Type: **Contributed**

Investigating Supergiant Fast X-ray Transients within the XMM-Newton EXTraS project

Monday, September 9, 2019 5:40 PM (15 minutes)

The sub-class of high mass X-ray binaries called Supergiant Fast X-ray Transients (SFXTs) shows flaring activity even outside outbursts, across more than four orders of magnitude in X-ray luminosity. We investigated these X-ray flares exploiting the XMM-Newton archival observations, taking advantage of the EPIC (0.2-12 keV) products made publicly available by the EXTraS project. Adopting the Bayesian block decomposition of the EPIC X-ray light curves of a sample of SFXTs, we picked out 144 X-ray flares covering an ample range of luminosities, from quiescence to outbursts. Their aperiodic temporal properties, like the rise time to and the decay time from the peak of the flares, their duration and the time interval between adjacent flares, as well as their peak luminosity and emitted energy, show a behavior consistent with the onset of Rayleigh-Taylor instability in accreting plasma near the neutron star magnetosphere.

Affiliation

INAF-IASF Milano

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: SIDOLI, Lara (Istituto Nazionale di Astrofisica (INAF)); Prof. POSTNOV, Konstantin (Sternberg Astronomical Institute, Moscow, Russia); BELFIORE, Andrea (INAF - IASF Milano); Dr MARELLI, Martino (INAF-IASF Milano); Dr DAVID, Salvetti (INAF-IASF Milano); Dr SALVATERRA, Ruben (INAF-IASF Milano); Dr DE LUCA, Andrea (INAF-IASF Milano); Dr ESPOSITO, Paolo (INAF-IASF Milano)

Presenter: SIDOLI, Lara (Istituto Nazionale di Astrofisica (INAF))

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **49** Type: **Contributed**

Comparing radio-loud Swift/BAT AGN with their radio-quiet counterparts

Thursday, September 12, 2019 10:15 AM (15 minutes)

Some AGN are known to be efficient producers of strong, relativistic jets which power the extended radio sources. Most spectacular in respect of powers and sizes are the radio sources associated with AGN hosted by giant elliptical galaxies. However even among them, the production of powerful jets is a very rare phenomenon and the unanswered question remains why it is so. Since relativistic jets are most likely powered by rotating BHs via the Blandford-Znajek mechanism, one might expect that the parameters deciding about efficient jet production are BH spins and magnetic fluxes. If their values are large, then the innermost portions of accretion flow should be affected by the jet production and this should be imprinted in their radiative properties. In order to verify whether this is the case, we compare the radiative properties of radio-loud and radio-quiet AGN selected from the Swift/BAT catalog with similar BH masses and Eddington ratios. As we have found the only significant difference concerns the hard X-ray luminosities, which are about two times larger in radio-loud (RL) AGN than in radio quiet (RQ) AGN. One might speculate that this difference comes from having in RL AGN X-ray contribution not only from the innermost, hot portions of accretion flow, but also from a jet. However, this interpretation is challenged by our following findings: (1) hard X-ray spectra of RL AGN have similar slopes and high-energy breaks to those of RQ AGN; (2) hard X-ray radiation is to be in both RQ and RL AGN quasi-isotropic. Hence we argue that production of hard X-rays in the RL AGN is like in the RQ AGN, dominated by hot, central portions of accretion flows, while larger X-ray production efficiencies in RL AGN can be associated with larger magnetic fields and faster rotating BHs in these objects.

Affiliation

Nicolaus Copernicus Astronomical Center

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Ms GUPTA, Maitrayee (Nicolaus Copernicus Astronomical Center)

Co-authors: Prof. SIKORA, Marek (Nicolaus Copernicus Astronomical Center); Ms RUSINEK, Katarzyna (Nicolaus Copernicus Astronomical Center)

Presenter: Ms GUPTA, Maitrayee (Nicolaus Copernicus Astronomical Center)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **50** Type: **Contributed**

Green Peas - the X-ray brightest star forming galaxies?

Tuesday, September 10, 2019 10:45 AM (15 minutes)

Reionization of the Universe after the Dark Ages played an important role in the galaxy formation and observability. The source of the ionizing radiation is, however, not yet clearly determined. The main contribution is commonly attributed to strong AGN activity or tremendous star formation. Green Peas represent a class of compact high star-forming galaxies that have recently been found to show signatures of the escape of the ionizing flux. Despite the intensive studies of Green Peas in UV and optical domain, their X-ray properties were not known. We performed the first measurements of three Green Pea galaxies in the X-ray domain with the XMM-Newton satellite and constrained their X-ray spectral properties and flux at high energies. We found that two sources have their X-ray luminosity exceeding 10^{42} erg/s, which is unusual for a purely star-forming galaxy and is more than half order of magnitude larger than predicted from the known empirical relations between the X-ray flux and the star formation rate, considering also their metallicity. Our results thus indicate that some Green Pea galaxies may produce significantly more high-energetic flux than other similar star-forming galaxies. The measured variety of the X-ray characteristics of Green Pea galaxies challenges our full understanding of the relation between the X-ray luminosity and the star formation rate in compact dwarf galaxies and we will discuss some possible explanations, including the presence of a hidden active nucleus, ultra-luminous X-ray sources, different stellar population or X-ray excess due to hot gas.

Affiliation

Astronomical institute of the Czech Academy of Sciences

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: SVOBODA, Jiří; Mrs DOUNA, Vanesa (CONICET-UBA); EHLE, Matthias (ESA-ESAC); Mrs ORLITOVA, Ivana (Astronomical institute of the Czech Academy of Sciences)

Presenter: SVOBODA, Jiří

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **51** Type: **Contributed**

Shocking news from the ICM

Tuesday, September 10, 2019 3:35 PM (15 minutes)

In the process of cluster formation, giant shock waves are driven in the intra-cluster medium (ICM) leaving remarkable imprints in the X-ray emitting gas. The detection of these fronts is complicated as shocks are generally located in the cluster outskirts, where the count statistics is low. In the very recent years, the number of merger shocks observed increased thanks to deep observations performed with Chandra, XMM-Newton, and Suzaku, allowing us to study the mechanisms leading to the formation of relativistic particles in the ICM.
I will report on the recent discoveries of new shocks in the ICM of a number of clusters. In particular, I will:
(i) discuss the connection between shocks and radio relics (i.e. diffuse synchrotron sources found in cluster outskirts). Although the relic-shock connection is nowadays indisputable, the acceleration of particles via the commonly adopted diffusive shock acceleration theory is severely challenged by the low Mach numbers of merger shocks if electrons are accelerated from the thermal pool. I will show that other mechanisms, such as shock re-acceleration of a pre-existing population of mildly relativistic particles, are favored by current observations.
(ii) present the results of a recent work aimed to search for new edges in the ICM in an objective way thanks to the combination of different techniques of X-ray data analysis. In this work, 22 new discontinuities were found in a sample of 15 merging clusters (6 shocks, 8 cold fronts, and 8 edges with uncertain origin), increasing the number of discontinuities observed in merging systems.

Affiliation

IRA-INAF

Topic

Hot and diffuse baryons

Primary author: BOTTEON, Andrea (IRA-INAF)

Presenter: BOTTEON, Andrea (IRA-INAF)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **52** Type: **Contributed**

Dissecting AGN feedback: the extraordinary multi-phase outflow in the Narrow Line Seyfert 1 IRAS17020+4544

Wednesday, September 11, 2019 3:30 PM (15 minutes)

The growing evidence for energy-conserving outflows in powerful and luminous AGN supports the idea that high-velocity X-ray winds launched from the accretion disc evolve after undergoing a shock with the ambient medium, with the ultimate effect to expel enough mass and energy so as to produce the so-called AGN feedback, often invoked in galaxy formation and evolution. This talk will present the case for a multi-phase energy-conserving outflow in the Narrow Line Seyfert 1 Galaxy IRAS17020+4544 spanning from accretion disk to galaxy-scale, which has been targeted by an unprecedented multi-wavelength campaign by the following observatories: XMM-Newton, Chandra-LETG, VLBA, Large Millimeter Telescope, NOEMA and HST/COS. Perspectives on future X-ray observations and on other similar sources will be included.

Affiliation

CONACyT- Instituto Nacional de Astrofísica, Óptica y Electrónica INAOE (Puebla)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr LONGINOTTI, Anna Lia (INAOE Puebla)

Presenter: Dr LONGINOTTI, Anna Lia (INAOE Puebla)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **53** Type: **Poster**

AGN Clustering and Halo Occupation Distribution from X-ray surveys

Friday, September 13, 2019 6:16 PM (2 minutes)

Clustering of AGNs give additional clues to understanding the physical processes of supermassive black hole accretion. The strength of large scale clustering (bias parameter) gives a typical mass of Dark Matter Halos (DMHs) in which the AGN live in. Small scale clustering give additional clues on how the AGNs distribute among DMHs through Halo Occupation Distribution (HOD) modelings. We present the results of our series of AGN clustering measurements using two-point cross-correlation function (CCF) of ROSAT All-Sky Survey/Swift BAT AGNs with galaxy samples and their HOD modelings.

We emphasis on the results of our recent CCF measurements between Swift BAT AGNs and 2MASS redshift-survey galaxies in the local universe (z<0.037) and those between RASS (SDSSIV-SPIDERS) AGNs and BOSS-CMASS galaxies at $z \sim 0.55$. The new results include the findings that: (1) the typical DMH masses from the biases of the local Swift BAT AGNs
($42 \log L_{14-195\mathrm{keV}} < 44$) type 1 and type 2 AGN samples are similar ($M_{\mathrm{DMH}} \sim 10^{13} h^{-1} \mathrm{M}_{\odot}$), which is also close to our previous results for $z \sim 0.3$, $\log L_{\mathrm{X}} \mathrm{erg\,s}^{-1} \sim 44$ RASS AGNs (2) the small scale clustering (the one-halo term regime) is suppressed in the type I AGN only, that may imply that the type I AGN fraction among galaxies decrease with increasing DMH mass, as we found for the $z \sim 0.3$ RASS AGNs. This tendency has not been observed with the type 2 AGN sample.

We also discuss the implications of our results by comparison them with AGNs in cosmological simulations under a few scenarios.

Affiliation

Universidad Nacional Autónoma de México

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: MIYAJI, Takamitsu (IA-Ensenada, Universidad Nacional Autónoma de México); Dr MIRKO, Krumpe (Leibniz Institut für Astrophysik Potsdam); Prof. COIL, Alison; Dr ACEVES, Hector (Universidad Nacional Autónoma de México)

Presenter: MIYAJI, Takamitsu (IA-Ensenada, Universidad Nacional Autónoma de México)

Session Classification: POSTER SESSION

Contribution ID: **54** Type: **Poster**

ANEPD-CXO245: A COMPTON THICK AGN WITH DOUBLE-PEAKED NARROW LINES

Friday, September 13, 2019 5:42 PM (2 minutes)

ANEPD-CXO245: A COMPTON THICK AGN WITH DOUBLE-PEAKED NARROW LINES.

In our multi-wavelength survey of the AKARI North Ecliptic Pole Deep Field, including X-ray observations obtained with Chandra (Krumpe et al. 2015), we have found a highly absorbed AGN (ANEPD-CXO245, hereafter CXO245; z = 0.449) that shows double-peaked narrow emission lines. The X-ray spectrum of CXO245 from our Chandra observations shows a prominent redshifted Fe Kα emission line at 6.4 keV with an equivalent width EW $\geq$ 2 keV (both in rest-frame). Our X-ray spectral analysis using the borus02 (Balokovic et al. 2018) AGN torus model shows that the torus/line-of sight column density of log(N_H) = 24.3 - 25.4 (90% confidence) and thus it can be classified as Compton-thick.

In order to distinguish among possible explanations for this behavior (a dual AGN, a rotating ring around the central black hole, or the view of the two sides of a bi-polar outflow), constraints on the opening angle of the obscuring dusty torus ($\theta_{\rm tor}$), as well as the line-of-sight (LOS) inclination ($\theta_{\rm inc}$) are important. We obtained the constraints on these torus parameters by (1) fitting our multi-wavelength SED (optical-IR) with the CIGALE SED analysis package (Noll et al. 2009), using an AGN torus emission component (Fritz et al. 2006) and (2) fitting the Chandra spectrum with borus02.

The results obtained with both the optical-IR and X-ray analyses consistently show that and $\theta_{\rm inc}$ is only slightly larger than $\theta_{\rm inc}$ (both from the torus polar axis), i.e., the LOS is just below the inner funnel of the torus. However, the constraints on $\theta_{\rm inc}$ and $\theta_{\rm tor}$ are highly degenerate, and deeper observations in the X-ray regime are required to obtain individual constraints. We also report the results of the analysis using the Clumpy Torus model (Nenkova 2008) in combination with the new XCLUMPY model (Tanimoto et al.).

Affiliation

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Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Dr HERRERA-ENDOQUI, Martin (Instituto de Astronomía, Universidad Nacional Autónoma de México, Unidad Académica en Ensenada, Km 103 Carr. Tijuana–Ensenada, Ensenada Baja California, 22860, México); Dr MIYAJI, Takamitsu (Instituto de Astronomía, Universidad Nacional Autónoma de México, Unidad Académica en Ensenada, Km 103 Carr. Tijuana–Ensenada, Ensenada Baja California, 22860, México); Dr KRUMPE, Mirko; HANZAWA, Masaki; MATSUURA, Shuji; AKARI NEPD FIELD SURVEY TEAM

Presenter: Dr HERRERA-ENDOQUI, Martin (Instituto de Astronomía, Universidad Nacional Autónoma

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Session Classification: POSTER SESSION

Contribution ID: **57** Type: **Poster**

X-rays, SZ and Optical joint analysis of the hot and diffuse baryons within the Planck-detected triple-cluster systems

Friday, September 13, 2019 4:36 PM (2 minutes)

Recent stacking analysis of Sunyaev-Zel'dovich (SZ) oberservations of hundreds of superclusters have revealed the presence of the warm-hot intergalactic medium (WHIM) as a component of the intercluster gas. This indicates that superclusters are good targets to directly study the WHIM.

We are conducting a detailed study of two triple-cluster systems detected by Planck. We will jointly analyse the SZ data from Planck together with X-rays and galaxy distribution observations with *XMM-Newton* and *VTL/FORS2* respectively. We will present the supercluster components including a possible direct detection of WHIM. We will discuss their physical properties (e.g. temperature, density, pressure, entropy) and their impact on the missing baryon problem.

Affiliation

IAS, CNRS/Université Paris-Sud, Université Paris-Saclay, Orsay CEDEX, France

Topic

Hot and diffuse baryons

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Presenter: Mr LECOQ, Edouard (IAS, CNRS/Université Paris-Sud, Université Paris-Saclay, Orsay CEDEX, France)

Session Classification: POSTER SESSION

Contribution ID: **58** Type: **Poster**

Tracking the Iron Kα line and the Ultra Fast Outflow in NGC 2992

Friday, September 13, 2019 6:04 PM (2 minutes)

Variability is one of the best tools to investigate the emission mechanisms in Active Galactic Nuclei (AGN). We report on the 2010 XMM-Newton monitoring of the highly variable Seyfert 2 Galaxy NGC 2992, which was subsequently targeted by Swift and NuSTAR in 2015. XMM-Newton always caught the source in a faint state but NuSTAR observed a brightening of the source, with evidence of an Ultra Fast Outflow with velocity v=0.21±0.01c. A re-analysis of the high flux 2003 XMM data confirmed the presence of such a highly ionized accretion disk wind, with two distinct outflowing velocities (v1=0.215±0.005c and v2=0.305±0.005c). The UFO in NGC 2992 is consistent with being ejected at a few tens of gravitational radii only at accretion rates greater than 2% of the Eddington luminosity.
The analysis of the XMM data also allowed us to determine that the Iron Kα emission line complex in this object is likely the sum of three distinct components: a constant, narrow one due to reflection from cold, distant material (likely the molecular torus); a narrow, but variable one which is more intense in brighter observations and a broad relativistic one emitted in the innermost regions of the accretion disk.

Affiliation

Agenzia Spaziale Italiana

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: MARINUCCI, Andrea (Agenzia Spaziale Italiana)

Co-authors: BIANCHI, Stefano (Università degli Studi Roma Tre); BRAITO, Valentina; Prof. MATT, Giorgio (Università Roma Tre); NARDINI, Emanuele (Istituto Nazionale di Astrofisica (INAF)); Dr REEVES, James (University of Maryland)

Presenter: MARINUCCI, Andrea (Agenzia Spaziale Italiana)

Session Classification: POSTER SESSION

Contribution ID: **59** Type: **Poster**

Radio bimodality of Swift/BAT AGNs and SDSS quasars

Friday, September 13, 2019 6:38 PM (2 minutes)

Comparison of properties of quasars with those of low redshift AGNs with similar BH masses but accreting at much lower accretion rates provides exceptional opportunity to study the dependence of the properties of these massive accretion systems on the specific accretion rate. This particularly concerns abilities of such systems to produce powerful jets. We present here results of comparison of radio-loudness distributions and discuss them in the context of investigated in literature scenarios proposed to explain the radio-dichotomy of AGN. Our preliminary results indicate that: (1) there is an explicit bimodality in the radio-loudness distributions in both populations; (2) the radio-loud fraction of AGNs accreting at moderate rates is larger than of quasars. These differences are consistent with predictions of the MAD (magnetically-arrested-disk) scenario for the production of strong jets and favor the model according to which central accumulation of magnetic flux proceeds prior to the AGN/quasar event.

Affiliation

Nicolaus Copernicus Astronomical Center Polish Academy of Sciences

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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Co-authors: Prof. SIKORA, Marek (Nicolaus Copernicus Astronomical Center); GUPTA, Maitrayee (Nicolaus Copernicus Astonomical Center)

Presenter: Ms RUSINEK, Katarzyna (Nicolaus Copernicus Astronomical Center Polish Academy of Sciences)

Session Classification: POSTER SESSION

Contribution ID: **60** Type: **Contributed**

The disk-corona interplay in radiatively-efficient broad-line AGN

Thursday, September 12, 2019 12:25 PM (15 minutes)

Through the years, AGN accretion theory has lagged behind with respect to the plethora of observational signatures driven by accretion onto supermassive black holes. For instance, the smoking gun of the disk-corona interplay in radiatively-efficient AGN is given by the correlation observed between monochromatic $\log L_X - \log L_{UV}$. Despite being used for decades (since the introduction of the more-known α_{ox} parameter, Tananbaum et al. 1979), and for many applications (even for cosmology, e.g. Risaliti & Lusso 2018), it still lacks a conclusive theoretical explanation.

We tested our disk-corona model (Merloni 2003; Arcodia+ in subm.) against the observed $\log L_X - \log L_{UV}$. The observed slope, being smaller than one, indicates that going from lowly- to highly-accreting AGN the corona emission increases less than the disk emission, with crucial implications for the accretion physics governing the system. Our model can predict this key ingredient in terms of modified viscosity prescriptions in the flow, inherently yielding a corona that becomes comparably weaker than the disk for increasing accretion rates. We also put forward a more quantitative observational test using a reference sample of broad-line AGN and modeling every single source in the $L_X - L_{UV}$ plane, to have an in-depth understanding of the physics driving the slope, normalization and intrinsic scatter of one of the most used AGN X-ray to UV observables.

Affiliation

Max-Planck Institute for Extraterrestrial Physics, Garching bei Muenchen

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr ARCODIA, Riccardo (Max-Planck-Institute for Extraterrestrial Physics)

Co-authors: MERLONI, Andrea; NANDRA, Kirpal

Presenter: Mr ARCODIA, Riccardo (Max-Planck-Institute for Extraterrestrial Physics)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **61** Type: **Poster**

Searching for X-ray emission from an electron/positron pair halo with current generation and next generation X-ray telescopes

Friday, September 13, 2019 3:16 PM (1 minute)

An electron/positron pair halo is the electromagnetic cascade generated under extragalactic magnetic field when very high energy γ-rays, particularly from blazar, interact with the extragalactic background light and/or the cosmic microwave background forming the pairs of electron/positron and further lower energy γ-rays. These result in an extended emission of the γ-rays enclosing the host blazar, i.e. halo. The search for the halo emission has been attempted primarily in the γ-rays regime and no detection has been claimed to date. Indeed, if such an halo presents in a sufficiently strong magnetic field, the X-ray light could be also generated via synchrotron emission process, providing another opportunity for searching the halo. In this work, we aim to test whether the X-ray emission from the halo would be detected by the current generation and next generation X-ray telescopes: i.e. *XMM-Newton* and *Athena*, respectively. The Monte Carlo technique is used to simulate the X-ray emissions of the halo at difference initial conditions such as different energy distributions of the seed γ-rays photons and different levels of magnetic field. The possibility of detecting the halo emission by the X-ray telescopes is then determined using the response matrix and ancillary response files provided on the telescope webpages. In this presentation, we will show whether the halo emission would be detected by the X-ray telescopes? We will also discuss the range of physical parameters of the halo which make the halo emission statistically detectable.

Affiliation

Department of Physics, Faculty of Science, Srinakharinwirot University; School of Science, Mae Fah Luang University; National Astronomical Research Institute of Thailand

Topic

Primary author: Dr LUANGTIP, Wasutep (Srinakharinwirot University)

Co-author: Dr EUNGWANICHAYAPANT, Anant (Mae Fah Luang University)

Presenter: Dr LUANGTIP, Wasutep (Srinakharinwirot University)

Session Classification: POSTER SESSION

Contribution ID: **62** Type: **Poster**

The soft gamma-ray sky observed with INTEGRAL's IBIS-PICsIT detector

Friday, September 13, 2019 5:56 PM (2 minutes)

Multi-messenger astronomy entered a new phase after the detection of gravitational waves, fast radio bursts and a recent progress in the neutrino astrophysics. It is evident that the observations over the whole electromagnetic domain become more and more important. Deailed spectral information in the soft gamma-ray band (100 keV - 100 MeV) is essential to study the physical processes responsible for the non-thermal emission, e.g. the jet physics or antimatter annihilation.

The IBIS high energy detector PICsIT on board INTEGRAL satellite is one of the few instruments observing currently the sky in the soft gamma-ray band since 2002. Thanks to the coded-mask technique the PICsIT's angular resolution is unprecedented. Despite the high instrumental background, due to cosmic rays, a careful, fully-Bayesian data analysis allowed to detect several dozens of high-energy sources, providing unique results in the 240-1000 keV energy range.

In this review a spectral catalog of all detected objects will be presented. Examples of the modeling of the spectra will be shown with an emphasis to the broad-band study for a diagnosis of the non-thermal plasma and jet emission in various accreting systems such as bright Active Galactic Nuclei, transient and persistent galactic black holes. In addition, the presence of the positron annihilation features will be addressed for several objects.

Affiliation

Institute of Physics, University of Zielona Gora

Topic

Primary authors: Dr LUBINSKI, Piotr (University of Zielona Góra, Institute of Physics); Dr BAZZANO, Angela (IASF, INAF, Rome); Dr NATALUCCI, Lorenzo (IASF, INAF, Rome); Dr RODI, James (IASF, INAF, Rome); Prof. UBERTINI, Pietro (IASF, INAF, Rome)

Presenter: Dr LUBINSKI, Piotr (University of Zielona Góra, Institute of Physics)

Session Classification: POSTER SESSION

Contribution ID: **63** Type: **Poster**

Studying circumnuclear matter in Compton-thick AGN via spectroscopy and future X-ray polarimetry

Friday, September 13, 2019 7:06 PM (2 minutes)

The archetypal and one of the brightest Compton-thick AGN is NGC 1068, which was observed by all the main X-ray observatories during the last 20 years. Keeping in mind the previous studies, I will discuss the results obtained through the spectroscopic analysis of the latest NuSTAR monitoring campaign, during which we detected one unveiling and one eclipsing event due to Compton-thick matter supposedly located in the innermost part of the torus or even more inside, thus providing further evidence of the clumpy structure of the circumnuclear matter in this source. Furthermore, I will discuss what we can infer on the geometry of NGC 1068 and other Compton-thick AGN with the advent of future X-ray polarimetry missions, such as the X-ray Polarimetry Explorer (IXPE), due to be launched in April 2021.

Affiliation

Roma Tre University

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: ZAINO, Alessandra (Roma Tre University)

Co-authors: BIANCHI, Stefano (Università degli Studi Roma Tre); MARINUCCI, Andrea (Università Roma Tre); Prof. MATT, Giorgio (Università Roma Tre)

Presenter: ZAINO, Alessandra (Roma Tre University)

Session Classification: POSTER SESSION

Contribution ID: **64** Type: **Poster**

X-ray properties of clusters in the C-EAGLE simulations

Friday, September 13, 2019 4:48 PM (2 minutes)

Cluster outskirts are an area of great interest as they contain a wealth of information as to how the hot intracluster medium (ICM) forms and contributes to the growth of large scale structures. With the advent of *Athena*, measurements of the ICM should be possible beyond the virial radius. To this end, we present the metallicity profiles and distribution of different metals for the C-EAGLE simulation, a suite of 30 massive galaxy clusters (M500 > 10^14 Msun), focussing on the cluster outskirts, r > R200.

We also present the CELR (C-EAGLE at low resolution) sample, for which we have investigated how using mock X-ray temperatures combined with mock X-ray density profiles leads to more biased estimates for the mass of more massive clusters. We have found that this bias can be improved by including a model for non-thermal pressure, but a mass dependence of the bias is still seen.

Affiliation

University of Manchester

Topic

Hot and diffuse baryons

Primary authors: Ms PEARCE, Francesca (University of Manchester); Dr KAY, Scott (University of Manchester); Dr BARNES, David (MIT)

Presenter: Ms PEARCE, Francesca (University of Manchester)

Session Classification: POSTER SESSION

Contribution ID: **65** Type: **Poster**

Accretion disk atmosphere of X-ray binaries: The case of EXO 0748-676

Friday, September 13, 2019 3:48 PM (2 minutes)

X-ray binaries exhibit ionized emission from an extended disk atmosphere that surrounds the accretion disk. However, the nature and exact geometry of the atmosphere are not fully understood. Here, I will present results from our recently published paper (Psaradaki et al. 2018) about the case study of the bright low-mass X-ray binary EXO 0748-676. In this work we carry out high-resolution X-ray spectroscopy of archival XMM-Newton observations in order to probe the accretion disk atmosphere. We model the high-resolution spectrum obtained when the compact object is eclipsed by the companion star. This unique situation enables us to study the emission lines that come only from the disk atmosphere of the source and gain new insights into its physical structure.
The emission line spectrum reveals two photoionized gas components with different physical characteristics. We propose a scenario where the high ionization component constitutes an extended upper atmosphere of the accretion disk. The lower ionization component may instead be a clumpy gas created by the accretion stream from the companion star impacting the disk.

Affiliation

SRON, The Netherlands Institute for Space research

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Ms PSARADAKI, Ioanna (SRON, The Netherlands Institute for Space Research)

Co-authors: Dr COSTANTINI, Elisa (SRON, The Netherlands Institute for Space Research); Dr MEHDIPOUR, Missagh (SRON, The Netherlands Institute for Space Research)

Presenter: Ms PSARADAKI, Ioanna (SRON, The Netherlands Institute for Space Research)

Session Classification: POSTER SESSION

Contribution ID: **66** Type: **Poster**

Probing the tenuous interstellar dust medium using soft X-ray absorption features

Friday, September 13, 2019 3:46 PM (2 minutes)

The interstellar dust permeates our Galaxy and plays a crucial role in star formation processes. It can control the temperature of the ISM and it is the catalyst for the formation of complex molecules. However, the exact chemical composition of dust grains is not yet fully understood. Insights can be gained by combining X-ray observations and laboratory measurements. High resolution X-ray spectroscopy of bright background sources gives the ideal workbench to study the chemical composition of dust in diffuse regions of the ISM through the absorption features of dust and gas. In particular, here we focus on the Fe L and O K absorption edges, two among the most abundant elements that determine the chemical composition of dust grains. For our spectral modelling we obtained new laboratory measurements of dust scattering and calculated the corresponding cross sections for samples of different chemical composition. The measurements were acquired with the Electron Energy Loss Spectrometer in Cadiz. Lastly, we examine systematic divergencies in the atomic (gaseous phase) data of the oxygen edge using different X-ray atomic databases.

Affiliation

SRON, The Netherlands Institute for Space research

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Ms PSARADAKI, Ioanna (SRON, The Netherlands Institute for Space research)

Co-author: Ms COSTANTINI, Elisa (SRON, The Netherlands Institute for Space Research)

Presenter: Ms PSARADAKI, Ioanna (SRON, The Netherlands Institute for Space research)

Session Classification: POSTER SESSION

Contribution ID: **67** Type: **Poster**

Classifying eROSITA's Variable Source Population

Friday, September 13, 2019 2:16 PM (2 minutes)

'eROSITA on-board the SRG satellite will perform the next large X-ray all-sky survey. With its 30-fold increased sensitivity relative to its predecessor ROSAT and its multi-visit, multi-cadence survey strategy, eROSITA will provide a new and deeper look into X-ray time domain astrophysics. To better handle the vast number of sources eROSITA is expected to detect, and assist with planning multi-wavelength follow-up, we are developing a pipeline for automated classification of the transient and variable source populations. We present an overview of this pipeline, and discuss the challenges of developing machine learning algorithms for classification of eROSITA's variable sources

Affiliation

Max Planck Institute for Extraterrestial Physics

Topic

Multi-messenger and transient astronomy

Primary authors: Mr MALYALI, Adam (Max Planck Institute for Extraterrestial Physics); Dr RAU, Arne (Max Planck Institute for Extraterrestial Physics); Prof. NANDRA, Kirpal (Max Planck Institute for Extraterrestial Physics)

Presenter: Mr MALYALI, Adam (Max Planck Institute for Extraterrestial Physics)

Session Classification: POSTER SESSION

Contribution ID: **68** Type: **Poster**

The XMM-Newton and NuSTAR monitoring campaign of MrK 359: a close view of the inner flows

Friday, September 13, 2019 6:12 PM (2 minutes)

We conducted a broadband multi-epoch campaign to observe the nearby Narrow Line Seyfert 1 galaxy Mrk 359. The monitoring consisted in 5 simultaneous XMM-Newton/NuSTAR observations (50 ks each) over a timescale of 10 days. During the campaign, Mrk 359 showed significant intra-observation variability, as well as among the pointings. Changes in the spectral slope occurred down to days timescales. A remarkable and variable soft-excess dominates the soft X-ray band. Besides a prominent and variable Fe Kalpha emission line, statistically significant absorption features at higher energies are also observed suggesting the presence of outflowing material.
We report on the broadband phenomenological modelling which reproduces the data-set, with particular emphasis on physically motivated Comptonisation models in a two-corona scenario.
Finally, the obtained results on Mrk 359 will be discussed and compared with outcomes from similar monitorings performed in the past.

Affiliation

Roma Tre

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: MIDDEI, Riccardo (Università degli Studi Roma Tre)

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Presenter: MIDDEI, Riccardo (Università degli Studi Roma Tre)

Session Classification: POSTER SESSION

Contribution ID: **69** Type: **Contributed**

Relation between winds and jets in radio-loud AGN

Wednesday, September 11, 2019 3:15 PM (15 minutes)

Accretion in active galactic nuclei (AGN) is accompanied by two modes of outflow: winds and jets. However, the connection between the winds, jets, and the accretion flows is not fully understood. I present the results of a recently-published paper (Mehdipour & Costantini 2019), where we have investigated the relation between the parameters of the ionised wind and the jet in a sample of radio-loud AGN. For this study we have carried out a systematic and homogeneous analysis of XMM-Newton spectra of a sample of radio-loud AGN. We discover a significant inverse correlation between the column density of the ionised wind and the power of the radio jet. We explore different possible explanations for this relation and find that ionisation, inclination, and luminosity effects are unlikely to be responsible. We show that the observed relation is rather a manifestation of the magnetic driving mechanism of the wind from the accretion disk. The results provide evidence for a wind-jet bimodality in radio-loud AGN and shine new light on the link between these two modes of outflow. I discuss the consequences of this finding for the accretion disk structure and the wind ejection mechanism. Finally, I talk about the future prospects for such wind-jet studies with the upcoming X-ray observatory ATHENA.

Affiliation

SRON Netherlands Institute for Space Research

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: MEHDIPOUR, Missagh (SRON Netherlands Institute for Space Research); COSTANTINI, Elisa (SRON, Netherlands Institute for Space Research)

Presenter: MEHDIPOUR, Missagh (SRON Netherlands Institute for Space Research)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **70** Type: **Poster**

A simple model to explain apparently complicated X-ray spectral variation of NGC5548

Friday, September 13, 2019 6:14 PM (2 minutes)

NGC5548 is known to exhibit complicated X-ray spectral variations such that double partial covering layers may have different covering fractions and that one of the fractions correlates with the photon-index of the power-law component (Cappi et al. 2016). It is hard to understand such a correlation between the two parameters that should be physically independent.

Here, we propose a simple model to explain the apparently complicated X-ray spectral variation of NGC5548. In our model, the continuum spectrum from the central region is a cut-off power-law dominant above ~1 keV with a soft excess below ~1 keV (which may be expressed with the disk black body model). The X-ray emission region is fully covered by a highly ionized inner-wind and partially covered by an outer-clumpy absorbing layer, where each clumpy absorber is composed of the cold-core and a warm-layer; thus the "double partial covering" takes place with the same covering fraction.
In addition, we assume a cold outer-disk reflection component accompanying a narrow Fe emission line, and a thermal plasma component from the host galaxy; these components are not affected by the local absorbers.

We conducted extensive spectral study of NGC 5548 using XMM, Suzaku and NuSTAR in 0.3-78 keV in timescales from ~1000 sec to ~16 years. As a result, we found that most of the observed spectral variation over these timescales is explained by only variations of (1) the soft excess spectral component, (2) power-law normalization, and (3) partial covering fraction of the clumpy absorbers. The soft excess component is significantly variable over timescale of years, but rather stable in shorter timescales.
While the power-law normalization is moderately variable by a factor of ~3 in various timescales, the partial covering fraction is significantly variable from 0 (not covered at all) to ~0.98 (almost fully covered). The power-law photon-index, as well as other spectral parameters are hardly variable despite of apparently significant spectral variations.

Our model is consistent with the previous studies, where "Variable Double Partial Covering model" (Iso et al. 2016), explains spectral variations of 20 Seyfert galaxies observed by Suzaku in 2-70 keV, and the "hot-inner and outer-clumpy wind model"(Mizumoto et al. 2019) explains the Fe-K line lags commonly observed in Seyfert galaxies such as 1H0707-495 and Ark 564.
In addition, our model successfully explains wide-band spectral variations of MCG-6-30-15, NGC4593, NGC1365, Swift J2127.4+5654 and MCG-5-23-16 simultaneously observed by XMM-NuSTAR (Ebisawa et al. in this conference).

Affiliation

University of Tokyo, ISAS/JAXA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr MIDOOKA, Takuya (University of Tokyo, ISAS/JAXA)

Co-authors: Mr EBISAWA, Ken (University of Tokyo, ISAS/JAXA); Mr MIZUMOTO, Misaki (Durham university); Mr SUGAWARA, Yasuharu (ISAS/JAXA)

Presenter: Mr MIDOOKA, Takuya (University of Tokyo, ISAS/JAXA)

Session Classification: POSTER SESSION

Contribution ID: **71** Type: **Contributed**

Extraordinary X-ray variability from an intermediate-mass black hole

Wednesday, September 11, 2019 3:00 PM (15 minutes)

We report results from a series of X-ray observations of a local galactic core whose long-term properties over the course of the past ten years are consistent with a long-lived tidal disruption event. A new spectacular phenomenon is occurring in this system 2018 December onwards, when XMM-Newton has discovered massive, repeating X-ray flares. During these "quasi-periodic eruptions" (or QPEs) the X-ray count rate is two orders of magnitude higher for about one hour, repeating every nine hours. We present the most relevant QPE properties and we discuss (some of the) possible interpretations of this new phenomenon. Our results may provide clues on the origin of the soft X-ray excess in AGNs as well as a framework within which to interpret the unfeasibly rapid variability of the growing population of "changing-look" AGNs and other highly variable objects.

Affiliation

Centro de Astrobiología (CAB)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Dr MINIUTTI, Giovanni (Centro de Astrobiología (CAB)); Dr SAXTON, Richard (XMM-Newton SOC, ESAC); Dr GIUSTINI, Margherita (Centro de Astrobiología (CAB))

Presenter: Dr MINIUTTI, Giovanni (Centro de Astrobiología (CAB))

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **72** Type: **Poster**

Diving into the whirlpool –understanding accretion in High-Mass X-ray Binaries with Vela X-1

Friday, September 13, 2019 3:26 PM (2 minutes)

The eclipsing high mass X-ray binary Vela X-1 consists of an accreting X-ray pulsar orbiting an early type supergiant with an orbital period of ~ 9 days. It was discovered as an X-ray source by the Uhuru satellite and it has been observed since then by every X-ray observatory. Due to its brightness and variability as well as the large observational archives, Vela X-1 is the Rosetta stone for studies of wind accretion onto neutron stars.

We discuss the X-ray observational properties of the system in conjunction with the supergiant properties to test recent accretion models in high mass X-ray binaries, ranging from detailed descriptions of the wind acceleration (e.g., Sander et al. 2018) to modelling of the structure of the flow of matter close to the neutron star (e.g., EL Mellah, Keppens & Sundqvist 2018). We report new results on the impact of the wind clumpiness on the X-ray time variability and how the revised downwards wind speed implies dramatic consequences for the accretion process such as the formation of a wind-captured disc beyond the neutron star magnetosphere. Such a structure remains to be observed but its indirect signatures through jets or the torques it applies on the neutron star could well be within our observational grasp.

Affiliation

Instituto de Física de Cantabria (CSIC-UC)

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr MARTÍNEZ-NÚÑEZ, Silvia (Instituto de Física de Cantabria (CSIC-UC))

Co-authors: Dr KRETSCHMAR, Peter (ESA); Dr EL MELLAH, Ileyk (KU Leuven); Dr MANOUSAKIS, Antonis (Univ of Sharjah); Dr SANDER, Andreas (Armagh Observatory); Dr FÜRST, Felix (ESA); Dr GRINBERG, Victoria (Univ. Tübingen)

Presenter: Dr MARTÍNEZ-NÚÑEZ, Silvia (Instituto de Física de Cantabria (CSIC-UC))

Session Classification: POSTER SESSION

Contribution ID: **74** Type: **Poster**

The properties of the soft excess in the transient X-ray binary pulsars of the Small Magellanic Cloud

Friday, September 13, 2019 3:12 PM (1 minute)

The spectrum of X-ray accreting pulsars is usually well described by a hard power-law model, although several sources show also a significant soft excess at low energies. This feature is essential to investigate the physical processes on-going in accreting sources and can be ontained only through high-quality spectral data for such pulsars. To this aim, the best targets to observe are the transient accreting pulsars in the Small Magellanic Cloud: they can reach luminosities up to 10^{38} erg s^{-1} during their outbursts and, because of the low Galactic interstellar absorption in the SMC direction, they can provide high count-statistics spectra at low energies. In the last five years, we have observed with *XMM-Newton* large outbursts of four different pulsars in the SMC. Thanks to the high throughput and spectral resolution of *XMM-Newton*, these observations allowed us to investigate very deeply their spectral and timing properties at soft X-ray energies. In all cases, we detected a pulsating and low-temperature blackbody component, which can be ascribed to the reprocessing of the primary X-ray emission by the optically thick material at the inner edge of the accretion disk. Moreover, in one source we observed also a steady, hot thermal plasma component, which is very likely due to a diffuse collisionally-heated gas far from the accretion region. Finally, in all sources the RGS spectrum shows several narrow emission and absorption features: they cannot be attributed to the thermal plasma, but may be related to the photo-ionized matter located around the accreting source.

Affiliation

INAF - IASF Milano

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF)); Dr ESPOSITO, Paolo (INAF-IASF Milano); PINTORE, Fabio (Istituto Nazionale di Astrofisica (INAF)); SIDOLI, Lara (Istituto Nazionale di Astrofisica (INAF)); MEREGHETTI, Sandro (Istituto Nazionale di Astrofisica (INAF)); Dr TIENGO, Andrea (IUSS Pavia)

Presenter: LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **75** Type: **Poster**

The X-ray emission from hot subdwarf stars

Friday, September 13, 2019 3:13 PM (1 minute)

In the last decade the high throughput and spectral resolution of the *XMM-Newton* and *Chandra* X-ray telescopes has allowed us to investigate the X-ray emission from hot subdwarf stars. Up to now, we have detected in X-rays five sdO stars. All of them show intrinsic X-ray emission and their spectrum can be described with the sum of two or three thermal-plasma components, as in the case of normal O-type stars. Therefore, the X-ray emission seems to originate from shock instabilities in the wind. These results show that the X-ray observation of hot subdwarf stars is essential for understanding their properties.

Affiliation

INAF - IASF Milano

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF)); MEREGHETTI, Sandro (Istituto Nazionale di Astrofisica (INAF)); Dr ESPOSITO, Paolo (INAF-IASF Milano); Dr TIENGO, Andrea (IUSS Pavia)

Presenter: LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **76** Type: **Contributed**

High-resolution X-ray spectroscopy of the interstellar dust

Tuesday, September 10, 2019 12:35 PM (15 minutes)

High-resolution X-ray spectroscopy offers a unique and powerful way to establish the properties of dust grains in the interstellar medium of our Galaxy. Defining the dust chemistry is an excellent tracer of structure formation and evolution in the Galaxy. Diagnostic features in the spectra of X-ray sources, like oxygen, magnesium, silicon and iron K-edges, can be used to determine the chemical composition, size, and crystalline structure of the cosmic dust. Here, I present the first and unique broadband extinction modelling of interstellar dust in the X-ray band based on our dedicated laboratory measurements of interstellar dust analogues. Indeed, to properly derive the dust properties from X-ray observations, it is essential to build a database of accurate cross-section models. We present also the latest results on the on-going chemical-composition mapping of the Galactic plane, based on the synergy between high-resolution X-ray Chandra spectra of bright binaries and our new extinction model (e.g. Zeegers 2017, Rogantini et al. 2019, subm.) Finally, I address the impact and full potential of our broadband extinction modelling with the advent of future X-ray missions (XRISM and Athena; Rogantini et al. 2018).

Affiliation

SRON - Netherlands Institute for Space Research

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: ROGANTINI, Daniele (SRON)

Co-author: COSTANTINI, Elisa (SRON, Netherlands Institute for Space Research)

Presenter: ROGANTINI, Daniele (SRON)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **78** Type: **Poster**

Search for multiwavelength emission from the binary millisecond pulsar J1836-2354A

Friday, September 13, 2019 2:40 PM (1 minute)

We present a multi-wavelength search for X-ray, optical and gamma-ray emission from the radio milli-second pulsar J1836-2354A (M22A, hereafter) hosted in the Galactic globular cluster M22 (NGC 6656), at 3.2 kpc far from Earth. In the last two decades, the cluster was observed with the X-ray satellites XMM-Newton, Chandra and Swift.
Thanks to the ∼85 ks of exposure time, the 2014 Chandra observation allowed us to better constrain the position and the spectral parameters of the X-ray source. The radio and X-ray position are found being consistent within 1 sigma error box. The X-ray luminosity is 2-3$\times 10^{30}$ erg/s, in the 0.5-8 keV range, which makes M22A one of the faintest milli-second pulsar. The X-ray spectrum is consistent with a power-law of photon index ∼1.5, which favour as possible origin of the X-ray emission an intrabinary shock between the pulsar wind and the matter ablated from the companion star.
We also searched for optical and gamma-ray counterparts, using data from the Hubble Space Telescope and Fermi-LAT catalogues, respectively. No optical counterpart is found down to V=25.9 and I=24.7, which suggests a companion star not more massive than 0.1-0.2 M$\odot$. The low X-ray luminosity and the upper limit on the mass of the companion allow us to speculate whether M22A is a black widow or rather a redback.
Finally, from the inspection of the latest 8-year Fermi-LAT catalogue, we found a gamma-ray source (4FGL J1836.8-2354), associated with the cluster. However, its 95% error ellipse does not encompass the radio/X-ray position of M22A, though it is very close.

Further deep studies on these type of sources will be possible thanks to the new generation of X-ray satellites, as for example ATHENA, which will be able to achieve highly significative detections of very faint X-ray milli-second pulsars, thanks to its high spectral capabilities and to the reduced instrumental background level. This will unable the scientific community to retrieve more information about the temporal and spectral features of these sources and eventually to discriminate between the different emission scenarios.

Affiliation

Università degli Studi di Palermo, INAF-IASF Palermo, IAAT Universität Tübingen

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: AMATO, Roberta (Istituto Nazionale di Astrofisica (INAF))

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Presenter: AMATO, Roberta (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **80** Type: **Poster**

RELTRANS: A public model for X-ray reverberation mapping of accreting black holes

Friday, September 13, 2019 5:46 PM (2 minutes)

I will present the publicly available XSPEC model RELTRANS. The model calculates the light-crossing delays and energy shifts experienced by X-ray photons originally emitted close to the black hole when they reflect from the accretion disk and are scattered into our line-of-sight, accounting for all general relativistic effects. The model is fast and flexible enough to be simultaneously fit to the observed energy-dependent cross-spectrum for a large range of Fourier frequencies, as well as to the time-averaged spectrum. This not only enables better geometric constraints than only modelling the relativistically broadened reflection features in the time-averaged spectrum, but additionally enables constraints on the mass of supermassive black holes in active galactic nuclei and stellar-mass black holes in X-ray binaries. The model includes a self-consistently calculated radial ionization profile in the disk. I will show that the inclusion of this profile makes a significant difference to the parameters inferred from data through the example of a NuSTAR observation of the X-ray binary GRS 1915+105. I will also present model fits to the lag-energy spectrum of the Seyfert galaxy Mrk 335 that result in a best fitting black hole mass that is smaller than previous optical reverberation measurements (~7 million compared with ~14-26 million solar masses). I will discuss how in future X-ray and optical reverberation analyses can be combined to constrain the geometry of the X-ray emitting corona and the broad line region.

Affiliation

University of Oxford

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: INGRAM, Adam (University of Oxford)

Presenter: INGRAM, Adam (University of Oxford)

Session Classification: POSTER SESSION

Contribution ID: **81** Type: **Poster**

Uncovering luminous and highly obscured AGN with mid-infrared surveys

Friday, September 13, 2019 5:11 PM (1 minute)

Extensive efforts have been devoted during the past decade to uncover the AGN hidden under the most extreme X-ray column densities, the so called Compton-thick AGN. Still, although Compton-thick AGN could represent a significant fraction of the entire AGN population, they have escaped detection. Mid-IR surveys with the all-sky Wide-field Infrared Survey Explorer could uncover, at least in part, the elusive highly obscured SMBH growth in the most extreme luminous AGN. Although a few studies have already presented results from followup campaigns of WISE-based AGN samples, they typically lack the X-ray depth necessary to reveal the true nature of many of the objects.

In this talk I will present the results of a detailed analysis of the X-ray properties of a complete, mid-IR 12 microns flux-limited sample, of 97 luminous AGN candidates selected with WISE. The full 6 deg2 survey area has very deep X-ray coverage from XMM-Newton observations, reaching X-ray fluxes of just 10^-15 erg/cm2/s. To date 92 objects have spectroscopic redshifts and optical classifications. Thus, we can evaluate the reliability and effectiveness of WISE to uncover luminous, highly obscured systems. Moreover, we can provide independent estimates of the space density of obscured accretion up to redshift one, which can be compared with the results derived from wide-area, and shallower, X-ray surveys. We also discuss the prospects of detecting With Athena the 24% of the sample yet undetected with XMM-Newton.

Affiliation

Instituto de Fisica de Cantabria (CSIC-UC), Santander, Spain

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Prof. CARRERA, Francisco J (Instituto de Fisica de Cantabria (CSIC-UC), Spain); Dr MATEOS IBÁÑEZ, Silvia (Instituto de Física de Cantabria (CSIC-UC), Spain); Mr BARQUIN, Lorenzo (Instituto de Fisica de Cantabria (CSIC-UC), Spain); CORRAL, Amalia

Presenter: Prof. CARRERA, Francisco J (Instituto de Fisica de Cantabria (CSIC-UC), Spain)

Session Classification: POSTER SESSION

Contribution ID: **82** Type: **Poster**

Discovery of one super-Eddington neutron star in an eclipsing X-ray binary

Friday, September 13, 2019 4:14 PM (2 minutes)

We discovered eclipses and dips in one luminous (and highly variable) X-ray source (CXOM51 J132946.1+471042) in M51. It has a two-component spectrum with additional thermal-plasma emission; it approached an X-ray luminosity of 10^39 erg s-1 during outbursts in 2005 and 2012. From the timing of three eclipses in a series of Chandra observations, we determine the binary period (52.75 ± 0.63 h) and eclipse fraction (22 ± 0.1 per cent). We also identify a blue optical counterpart in archival Hubble Space Telescope images, consistent with a massive donor star (mass of ˜20-35 M⊠). By combining the X-ray light-curve parameters with the optical constraints on the donor star, we show that the mass ratio in the system must be M_2/M_1 ⊠ 18 and therefore the compact object is most likely a neutron star (exceeding its Eddington limit in outburst). The general significance of our result is that we illustrate one method (applicable to high-inclination sources) of identifying luminous neutron star X-ray binaries, in the absence of X-ray pulsations or phase-resolved optical spectroscopy. Finally, I will discuss the different X-ray spectral appearance expected from super-Eddington neutron stars and black holes at high viewing angles.

Affiliation

NAOC

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr WANG, Song

Co-authors: Prof. SORIA, Roberto; Dr URQUHART, Ryan; Prof. LIU, Jifeng

Presenter: Dr WANG, Song

Session Classification: POSTER SESSION

Contribution ID: **83** Type: **Poster**

Photoionisation Modelling of the Emission Line Regions in the Nucleus of NGC 7469

Friday, September 13, 2019 7:00 PM (2 minutes)

The Seyfert 1 galaxy NGC 7469 was the target of an extensive observing campaign with XMM-Newton in 2015. Analysis of the 640 ks RGS spectrum with the spectral fitting code SPEX, and the physically self-consistent photoionisation model PION, shows that the emission line region (ELR) is multi-phased, while also accounting for three warm absorber (WA) components. For the first time we characterise the emission features in the RGS spectrum in detail and derive estimates for the distances of the ELR from the central engine. These are ~2.5 pc for the two narrow line components if we adopt an extended emission region and assume a volume filling factor of 0.1, making the ELR to be further out from the nuclear black hole than the WA. We discuss how adjusting the volume filling factor could resolve the differences with distance estimates obtained from variability arguments. Comparisons with other AGN, such as NGC 5548 and NGC 3783, for which we have also computed distances, will be presented.

Affiliation

Mullard Space Science Laboratory, University College London

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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Co-authors: ARAV, Nahum; CAPPI, Massimo (Istituto Nazionale di Astrofisica (INAF)); DIGESU, Laura; KASPI, Shai; PALTANI, Stephane; Dr PETRUCCI, pierre-olivier (Institute of Planetary science and Astrophysics of Grenoble); Dr PONTI, Gabriele; URSINI, Francesco (Istituto Nazionale di Astrofisica (INAF))

Presenter: Mr WATERS, Sam (Mullard Space Science Laboratory, UCL)

Session Classification: POSTER SESSION

Contribution ID: **84** Type: **Poster**

Tracing supermassive black hole feedback, from the event horizon up to cluster scales

Friday, September 13, 2019 6:46 PM (2 minutes)

Observations performed in the last decades have shown that supermassive black holes (SMBHs) and cosmic structures are not separate elements of the Universe. While galaxies have sizes roughly ten orders of magnitude larger than SMBHs, black holes would not exist without matter feeding them, and cosmic structures would not be the same without feedback from SMBHs. Powerful winds/jets in active galactic nuclei (AGN) may be the basis of this co-evolution. Synergistic observations in the X-rays and other wavebands has been proven to be fundamental to map AGN winds from the event horizon up to galaxy scales, providing a promising avenue to study the multiphase SMBH feeding and feedback processes. The combination of X-ray, optical/UV, IR, and mm observations of IRAS F11119+3257 allowed us to link the SMBH activity to molecular outflows that may be able to quench star formation. Follow-up studies on other ULIRGs and quasars show very promising results. Moreover, a spatially resolved, spectroscopic analysis of AGN in clusters may allow us to probe the multiphase medium ranging from galactic to up cluster scales. Revolutionary improvements are expected from upcoming X-ray space observatories, such as XARM and Athena, in synergy with other major space- and ground-based facilities, such as JWST, ALMA, E-ELT, SKA.

Affiliation

University of Rome “Tor Vergata”

Topic

Primary author: TOMBESI, Francesco (University of Rome ”Tor Vergata”)

Presenter: TOMBESI, Francesco (University of Rome ”Tor Vergata”)

Session Classification: POSTER SESSION

Contribution ID: **85** Type: **Poster**

Studying the geometry and dynamics of the inner motion flows in AGN via FeK line variability

Friday, September 13, 2019 5:16 PM (2 minutes)

The dynamics and geometry of the innermost regions of accretion flows in Active Galactic Nuclei (AGN) are still largely uncertain. A fundamental way to understand these phenomena is the study of X-ray variability properties of the Fe K line complex since it is assumed to be a probe of the geometry of the matter flows close to SMBH and also of their physical state (i.e. ionization, density, velocity).

In my work I have analyzed XMM-Newton/pn spectra of bright X-ray nearby Seyfert 1 galaxies, adopting the analysis technique of the residual mapping: long exposures are sliced in time and each spectrum is fitted with simple models accounting only for the continuum emission; the residuals are then used to build-up an image in the time vs. energy domain to maximize possible spectral features and if/how they evolve in time, coupling time and spectral analysis.

My study is focused on the search for a modulated signal of emission and absorption features: it presence, or the lack of it, would allow us to understand the geometry of the structure of the absorbers/emitters in the central regions of the AGN. Also, comparison of different modulation patterns could show some kind of correlation between different phenomena, pointing to an interconnection between the motions of emitting and absorbing material.

Affiliation

DIFA - Università di Bologna, INAF-OAS

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: COSTANZO, Deborah (Università di Bologna)

Co-authors: Dr DE MARCO, Barbara (Nicolaus Copernicus Astronomical Center PAS); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); CAPPI, Massimo (Istituto Nazionale di Astrofisica (INAF)); Dr DADINA, Mauro (Istituto Nazionale di Astrofisica (INAF))

Presenter: COSTANZO, Deborah (Università di Bologna)

Session Classification: POSTER SESSION

Contribution ID: **87** Type: **Invited**

X-Ray Emission from Accreting White Dwarfs

Tuesday, September 10, 2019 12:10 PM (25 minutes)

Cataclysmic variables (CVs; interacting binaries in which a white dwarf accretes matter from a Roche-lobe filling donor on or near the main sequence) and symbiotic stars (white dwarf-red giant binaries) are excellent laboratories in which to study accretion physics, without having to worry about relativistic effects. Their fluxes are high enough to enable detailed X-ray and multiwavelength observations, due to a combination of moderately high luminosities (up to about 10^{34} erg s^{-1} or so) and short distances (many CVs are within 200 pc of the Earth). CVs and symbiotic stars can also be powered by nuclear burning, often in the form of nova eruptions. Here I will present several topics in which significant advances have been made in recent years. First, hard X-ray surveys with INTEGRAL and Swift/BAT have discovered a large number of magnetic CVs (as predicted) and a handful of symbiotic stars (a major surprise). Second, X-ray reflection has been established as a powerful tool for the study of accretion onto white dwarfs thanks to the high energy sensitivity of NuSTAR. Third, Fermi/LAT has detected more than a dozen novae in eruption as transient GeV gamma-ray sources, and we have begun to detect them concurrently as highly absorbed X-ray sources. Finally, there are several notable puzzles to do with the physics of accretion disks: why the low state disks in CVs still allows siginificant accretion onto the white dwarf, why hard X-ray emission remains when the boundary layer turns optically thick, and at what accretion rate this transition happens. Such questions should be addressed with the behaviors of X-ray binaries in mind, to probe the similarity and differences of the accretion disks based on the nature of the compact objects.

Affiliation

NASA/GSFC and UMBC

Topic

Primary author: MUKAI, Koji (NASA/GSFC and UMBC)

Presenter: MUKAI, Koji (NASA/GSFC and UMBC)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **89** Type: **Poster**

Supermassive Black Hole Winds in X-rays (SUBWAYS)

Friday, September 13, 2019 5:08 PM (2 minutes)

We have been awarded a Large Program of ~1.6 Ms with XMM-Newton in AO18, SUBWAYS ("Supermassive Black Hole Winds in X-rays"), designed to provide a unique observational framework to test the validity of physical models for Active Galactic Nuclei (AGN) outflows, and to ultimately understand their impact into their host galaxies. SUBWAYS will observe a representative sample of 19 objects at z=0.1-0.5, above the knee of the AGN luminosity function with the main goal of obtaining a statistically sound estimate of the duty cycle and physical parameters of ultra-fast outflows (UFOs). In the poster we we will highlight the main objectives of our program, we will present the sample selection and properties, and we will show the first results from the XMM-Newton observations available by the time of the conference.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Affiliation

Dipartimento di Fisica e Astronomia UNIBO & INAF-OAS

Primary author: Dr BRUSA, Marcella (Universita' di Bologna & INAF-OAS)

Presenter: Dr BRUSA, Marcella (Universita' di Bologna & INAF-OAS)

Session Classification: POSTER SESSION

Contribution ID: **90** Type: **Poster**

10 years of the Fermi/GBM Pulsar Project

Friday, September 13, 2019 3:18 PM (1 minute)

We review 10 years of continuous monitoring of accretion-powered X-ray pulsars with the Gamma-ray Burst Monitor (GBM), the softer-energy all-sky monitoring instrument aboard the Fermi Gamma-ray Space Telescope. The excellent combination of timing, spectral and full-sky coverage capabilities of GBM make it a unique instrument for the study of those objects. After discussing our analysis approach we present the most interesting results for individual sources.
Over 10 years of operation, GBM helped to characterize spin histories, outbursts and torque behaviors of transient and persistent sources, deriving ephemeris and orbital solutions for a variety of sources with high precision. This, in turn, makes possible the study of binary systems, as well as the long term pulsars spin histories, two elements that are crucial to understanding the accretion processes onto magnetized neutron stars. Recently, GBM played a fundamental role in discovering and characterizing the first Galactic Ultraluminous X-ray Pulsar, Swift J0243.6+6124. Today, after an outburst that took ~150 days, this unique source is still active and GBM keeps revealing more and more of its behavior.
This is emblematic of GBM capabilities and its exclusive scientific return.

Affiliation

NASA-MSFC/USRA

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: MALACARIA, Christian (NASA-MSFC/USRA)

Co-authors: Dr WILSON-HODGE, Colleen; Dr JENKE, Pete; Dr ROBERTS, Oliver

Presenter: MALACARIA, Christian (NASA-MSFC/USRA)

Session Classification: POSTER SESSION

Contribution ID: **91** Type: **Poster**

Can we quantify the hydrostatic bias using 2D temperature maps?

Friday, September 13, 2019 4:40 PM (2 minutes)

The ICM often shows significant two-dimensional structure generated by mergers and/or AGN feedback. Thermodynamical 2D maps have been extensively used in the study of galaxy clusters thanks to their great potential to characterize the dynamical state of a system. However, to date they are only used for a qualitative analysis (e.g. the determination of a shock or a cold front) leaving their full potential unexploited. We will discuss how temperature maps can be used, not only to identify substructures or study asymmetries in the projected distribution, but also to investigate the possible biases in the determination of cluster properties, such as global gas temperature or total mass and the impact on the scaling relations.
We will present a first attempt to use the scatter of the 2D maps to probe possible biases in hydrostatic mass estimates as a function of cluster dynamical state.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Hot and diffuse baryons

Primary author: Dr LOVISARI, Lorenzo (Center for Astrophysics | Harvard & Smithsonian)

Co-authors: Dr ETTORI, Stefano; GHIRARDINI, Vittorio (Center for Astrophysics | Harvard & Smithsonian)

Presenter: Dr LOVISARI, Lorenzo (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: POSTER SESSION

Contribution ID: **93** Type: **Poster**

Self-regulation between multiphase AGN outflows and hot halo rain

Friday, September 13, 2019 5:30 PM (2 minutes)

Feeding and feedback tied to SMBHs play central role in the cosmic evolution of galaxies. The self-regulated AGN cycle is matter of intense debate. I review key numerical and observational results of how SMBHs are coupled to the multiphase gaseous halos, linking the inner gravitational radius to the galactic scale, and vice versa. The turbulent galactic halo radiatively cools through a multiphase condensation rain of warm filaments and molecular clouds. In the nuclear region, the recurrent collisions between the clouds and filaments boost the SMBH accretion rate via Chaotic Cold Accretion (CCA). The CCA rapid variability triggers powerful ultrafast AGN outflows near the SMBH horizon, which propagate outwards and form entrained multiphase winds at the kpc scale. I highlight the key imprints of AGN feeding and outflow feedback and how the different phases are interconnected in terms of both kinematics and thermodynamics.

Affiliation

Princeton University

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: GASPARI, Massimo (Princeton University)

Presenter: GASPARI, Massimo (Princeton University)

Session Classification: POSTER SESSION

Contribution ID: **94** Type: **Contributed**

X-rays from the Cosmic Web: The Case of Abell 133

Wednesday, September 11, 2019 9:25 AM (15 minutes)

For years, detection of cosmic filaments has been an elusive target for observers. Although predicted by simulations and seen in the distribution of galaxies for decades, only a few statistically significant measurements of the diffuse web have been made, particularly in the X-ray regime. However, in a very deep (2.4 Ms) observation with Chandra around the cluster Abell 133 (z=0.055), we observed diffuse, filamentary structures extending beyond the cluster's virial radius. Due to the long exposure and high resolution of Chandra, these observations are a window into the capabilities of the next generation of X-ray satellites and, if these filaments are real, provide hope of soon being able to routinely observe cluster-feeding filaments. Here, we discuss the followup observations we have undertaken to confirm the presence of these filaments, the physical conditions we have inferred, and the possibilities for future missions in observing the cosmic web around clusters.

Affiliation

Observatories of the Carnegie Institution for Science

Topic

Hot and diffuse baryons

Primary author: CONNOR, Thomas (Observatories of the Carnegie Institution for Science)

Co-authors: Dr KELSON, Daniel (Observatories, Carnegie Institution for Science, Pasadena, CA, United States); Dr MULCHAEY, John (Observatories, Carnegie Institution for Science, Pasadena, CA, United States); Dr VIKHLININ, Alexey (Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, United States)

Presenter: CONNOR, Thomas (Observatories of the Carnegie Institution for Science)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **95** Type: **Poster**

The intrinsic fraction of type 2 AGN

Friday, September 13, 2019 5:14 PM (2 minutes)

Most AGN studies find that the obscured AGN fraction decreases as the luminosity increases. This is usually explained by invoking receding torus models. However, recent results for the intrinsic type 2 fraction based on a complete hard X-ray selected sample (BUXS: Bright Ultrahard XMM-Newton Survey) showed little to no luminosity dependence, and uncovered a population of hidden luminous Compton-thick AGN. We furthered this analysis by applying a fully Bayesian approach to derive the distribution of column densities (N_H) for the 252 AGN with spectroscopic redshifts within BUXS. For a sub-sample of type 1 AGN at $z = 0.05 - 1$, we compared these results to the ones obtained for the optical obscuration. We fitted the optical spectra to classify the sources in types (1.0-1.9), based on emission line ratios, and to measure the optical-UV continuum obscuration (A_V). We find that there is a clear tendency towards increasing A_V and N_H from 1.0 to 1.9 objects, with a statistically significant difference between the 1.0-1.2-1.5 and 1.8-1.9 subsets, showing that they are different families. Regarding the dust-to-gas ratio (A_V vs. N_H) we do not find a clear tendency, instead the distribution shows a large scatter. We have also explored the suitability of the ratio of the broad Hα and Hβ emission lines to estimate the obscuration in type 1 AGN, finding average values similar to previous ones but with substantial dispersion, concluding that this ratio should be taken with extreme caution, if not discarded as an obscuration measurement altogether.

Affiliation

IFCA (CSIC-UC, Spain)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: CORRAL, Amalia; MATEOS IBÁÑEZ, Silvia (Instituto de Física de Cantabria); CARRERA, Francisco J (Instituto de Fisica de Cantabria (CSIC-UC), Spain); Mr ORDOVAS-PASCUAL, Ignacio (IFCA (CSIC-UC), Spain)

Presenter: CORRAL, Amalia

Session Classification: POSTER SESSION

Contribution ID: **96** Type: **Poster**

A young, contracting white dwarf in the peculiar X-ray binary HD49798/RX J0648.0−4418

Friday, September 13, 2019 3:32 PM (2 minutes)

HD49798/RX J0648.0−4418 is the only known binary composed of a hot subdwarf star and an accreting neutron star or white dwarf. We discovered that the compact objects has a spin period of 13.2 s and is spinning up at a rate of 2×10^{-15} s/s.
The precise distance of 508 pc recently measured with Gaia strongly disfavours
the possibility that the pulsar be a neutron star. On the other hand, the accretion rate occurring in this system is too small to cause such a rapid spin-up in a white dwarf. We show that the spin-up is instead well explained by the decreasing moment of inertia of a massive white dwarf with an age of only ∼2 Myrs, still in the early contracting phase. Radial contraction in the early phase of white dwarf evolution is predicted by the theoretical models, but it has never been observed before.
Binary evolution computations show that several hundreds of systems with a white dwarf orbiting a hot subdwarf similar to HD49798 exist in the Galaxy and many of them can be revealed by future X-ray missions.

Affiliation

INAF, IASF-Milano

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: MEREGHETTI, Sandro (Istituto Nazionale di Astrofisica (INAF)); Prof. POPOV, Sergei; BLINNIKOV, S.I.; KURANOV, A.G.; YUNGELSON, L.R.; PINTORE, Fabio (Istituto Nazionale di Astrofisica (INAF)); Dr ESPOSITO, Paolo (INAF-IASF Milano); LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF)); Dr TIENGO, Andrea (IUSS Pavia); ISRAEL, GianLuca (Istituto Nazionale di Astrofisica (INAF)); Dr STELLA, Luigi

Presenter: MEREGHETTI, Sandro (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **97** Type: **Poster**

Completing the new generation of Chandra Extragalactic Surveys with the Chandra Deep Wide-Field Survey

Friday, September 13, 2019 6:06 PM (2 minutes)

X-ray surveys are one of the most efficient ways to detect active galactic nuclei (AGN) and perform statistically meaningful population studies. In the past decade, important results in this field came from both wide and deep X-ray surveys of the sky, performed following the well-known "wedding cake" approach.
Thanks to these surveys, there is now compelling evidence that there is a strong connection between the growth of Black Holes (BHs) and the evolution of large-scale structures.
To further test this picture, the Chandra Deep Wide Field Survey (CDWFS) was designed, able to probe large volumes and detect large numbers of AGN at the luminosities and redshifts that comprise the bulk of the growth of BHs. Indeed, the CDWFS pushes deeper the wide layer of the "wedding cake", to align with the sensitivity-area locus of the most recent Chandra surveys.
In this talk, the status of the survey and its perspectives will be discussed: we will take advantage of the exquisite Chandra angular resolution and sensitivity in order to study in detail the large-scale clustering of AGN and their Eddington-ratio distribution, to probe the AGN-Dark Matter halo and AGN-Star Formation connections.

Affiliation

Dartmouth College

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Dr MASINI, Alberto (Dartmouth College); Prof. HICKOX, Ryan (Dartmouth College)

Presenter: Dr MASINI, Alberto (Dartmouth College)

Session Classification: POSTER SESSION

Contribution ID: **98** Type: **Poster**

The Hunt for UFOs with Chandra-HETGS

Friday, September 13, 2019 6:22 PM (2 minutes)

Ultra-fast Outflows in AGN were first suggested based upon low spectral resolution CCD data in the 6-8 keV range, and were ascribed to absorption by highly ionized Fe. In this region, CCD resolution isn't dramatically below that of gratings. Further evidence for UFOs has been claimed from high spectral resolution observations with the XMM-Reflection Gratings Spectrometer, and has been extended to Ultra-Luminous X-ray sources. The <2 keV region, however, is extremely crowded, and UFO models often posit multiple absorbers with a range of blueshifts. It is not clear that even RGS resolution suffices. I discuss two recent UFO studies using the Chandra-HETGS. We gain from improved resolution, but suffer from low effective area. First, for the AGN PG1211+143, we were able to verify the presence of an absorber outflowing at 0.06 c. Next, for the ULX NGC 1313 X-1 we are still trying to determine if there is evidence for a UFO, and if not, do our observations contradict prior RGS studies?

Affiliation

Washington University in St. Louis

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: NOWAK, Michael (Washington University in St. Louis); Dr LEE, Julia (Harvard-SEAS); Dr KRISS, Gerry (STSCI); Prof. CANIZARES, Claude (MIT); Dr CIRO, Pinto (Cambridge University)

Presenter: NOWAK, Michael (Washington University in St. Louis)

Session Classification: POSTER SESSION

Contribution ID: **99** Type: **Contributed**

AGN radiative feedback: the effective Eddington limit for dusty gas

Wednesday, September 11, 2019 2:45 PM (15 minutes)

AGN radiative feedback, driven by radiation pressure on dust, is a key physical mechanism connecting the accreting black hole to its surrounding environment. The actual importance of radiative feedback can be observationally tested by analysing how X-ray-selected AGN samples populate the so-called "NH-lambda plane", defined by the column density versus the Eddington ratio. A "forbidden" region occurs in this plane, where obscuring clouds cannot be long-lived, and should be outflowing. We show how the inclusion of radiation trapping leads to an enhanced forbidden region, such that even Compton-thick material can potentially be disrupted by sub-Eddington luminosities. Comparing our model results to the most complete sample of local AGNs with measured X-ray properties, we obtain a nice agreement. In addition, by properly including radiation trapping, we can account for the dynamics and energetics of AGN-driven outflows observed on galactic scales. I will discuss how such radiative feedback may regulate both the AGN obscuration and outflow properties in the context of black hole-host galaxy co-evolution.

Affiliation

University of Zurich

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr ISHIBASHI, Wako (University of Zurich)

Presenter: Dr ISHIBASHI, Wako (University of Zurich)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **100** Type: **Contributed**

Galaxy groups in the local universe: results from a complete sample

Tuesday, September 10, 2019 3:50 PM (15 minutes)

Galaxy groups are arguably the most important environment for our understanding of galaxy evolution, AGN feedback and the development of the hot intergalactic medium (IGM). Previous studies of groups in the nearby universe have either used optically-selected samples to examine galaxy populations, or X-ray selected samples (from the Rosat All-Sky Survey) to examine IGM properties. While these approaches have yielded important results, their selection methods mean they are subject to significant biases. We have created the the Complete Local-Volume Groups Survey (CLoGS), an optically-selected statistically-complete sample of 53 groups in the nearby Universe (D<80 Mpc), surveyed in the X-ray (XMM-Newton and/or Chandra), low-frequency radio (GMRT 235 & 610 MHz) and, for the dominant galaxies, molecular gas (IRAM 30m or APEX CO). This combination of data allows us to confirm which groups are fully virialized, examine their dynamical and thermal state, and investigate the role of AGN feedback in these systems. We will present results from the sample, showing that roughly one third of X-ray bright groups in the local universe are dynamically active (merging or sloshing), and roughly one third show evidence of ongoing or recent feedback from central AGN. We will examine the conditions under which feedback occurs in groups, and show examples of powerful outbursts which may dramatically overheat the IGM. We will also show that a significant fraction (>20%) of the nearby group population has been missed by previous studies, and discuss the implications for future surveys.

Affiliation

Smithsonian Astrophysical Observatory

Topic

Hot and diffuse baryons

Primary author: O'SULLIVAN, Ewan (Smithsonian Astrophysical Observatory)

Co-authors: Dr KOLOKYTHAS, Konstantinos (IUCAA); Dr VRTILEK, Jan (Smithsonian Astrophysical Observatory); Dr DAVID, Laurence (Smithsonian Astrophysical Observatory); Dr GITTI, Myriam (Universita di Bologna); Dr SCHELLENBERGER, Gerrit (Smithsonian Astrophysical Observatory)

Presenter: O'SULLIVAN, Ewan (Smithsonian Astrophysical Observatory)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **101** Type: **Poster**

An XMM-Newton study of the hot gas in Early type galaxies

Friday, September 13, 2019 4:30 PM (2 minutes)

The distribution of hot ISM in early type galaxies (ETGs) bear the imprint of its formation and evolutionary history. The high sensitivity and large field of view of XMM-Newton has made it possible to investigate this diffuse emission in the galaxy outskirts, which is critical in understanding the interaction of this hot gas with the surrounding medium (e.g., by ram pressure stripping) and neighbouring galaxies (e.g., sloshing, merging), by measuring its spectral properties and mass profile on a larger scale.
I will be presenting an overview of the X-ray Galaxy Atlas project, where we systematically analysed the archival XMM-Newton observations of 50 ETGs and produced spatially resolved 2D spectral maps (temperature, density, pressure, entropy, abundances), with the aim of studying the distribution of the hot gas in these ETGs. These 2D spectral maps are more useful in revealing unique features in the distribution of hot gas, which may be not visible in 1D radial profiles or 2D surface brightness maps.
These results will be used complementary with the existing products from the Chandra Galaxy Atlas (http://cxc.cfa.harvard.edu/GalaxyAtlas/v1/), to investigate both small scale and large scale structures in the distribution of the hot gas in ETGs.

Affiliation

Center for Astrophysics | Harvard and Smithsonian

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: ISLAM, Nazma (Center for Astrophysics, Harvard and Smithsonian)

Co-author: KIM, Dong-Woo (Center for Astrophysics | Harvard & Smithsonian)

Presenter: ISLAM, Nazma (Center for Astrophysics, Harvard and Smithsonian)

Session Classification: POSTER SESSION

Contribution ID: **102** Type: **Contributed**

Investigating the X-ray Emission from high X-ray Luminosity Supernovae

Tuesday, September 10, 2019 11:55 AM (15 minutes)

Type IIn supernovae (SNe) are characterized by narrow lines on a broad base in their optical spectrum. A wide diversity in their lightcurves, and in SNe that exhibit IIn features, has greatly complicated the task of identifying their progenitors. IIns have the highest X-ray luminosity of all SN classes, and are observable in X-rays decades after explosion. Many of the lightcurves tend to fall off rather steeply at late times, although one interesting case displayed a rising light curve for several thousand days. These characteristics, along with their high luminosities at other wavelengths, imply initial expansion in a very dense medium in most cases. At later times the densities decrease faster than expected for expansion in a steady wind. Their X-ray spectra generally show distinct lines, suggesting that the emission is thermal in origin.
A recent exciting entry to the category of X-ray SN was the discovery by our group of a Type Ia-CSM, SN 2012ca, the first Type Ia SN of any kind to be detected in X-rays. Our best fit model for the X-ray emission from SN 2012ca suggests that it is expanding into a 2-component medium, with a number density around 10^8 cm^{-3} for the higher density component. Although the nature of these objects is unknown, we show that the X-ray properties of SN 2012ca are very similar to those of many Type IIn SNe.
We have compiled a database of lightcurves of most young SNe that have been detected in X-rays. Currently we have over 60 SNe spanning all the various types, but the database is expanding rapidly. The lightcurves themselves span 12 orders of magnitude in luminosity. We will show the X-ray lightcurves of IIns and the single Type Ia-CSM, compare their lightcurves and spectra to those of other types of SNe, as well as to data at other wavelengths. We will review the known properties of the X-ray emission from Type IIn, and explore the implications for the SN environment, progenitor mass-loss and the identity of the progenitors.

Affiliation

University of Chicago

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr DWARKADAS, Vikram (University of Chicago)

Presenter: Dr DWARKADAS, Vikram (University of Chicago)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **103** Type: **Poster**

Smoothed Particle Inference Analysis of Supernova Remnant DEM L71

Friday, September 13, 2019 2:48 PM (2 minutes)

Supernova remnants (SNRs) are complex, three-dimensional objects; properly accounting for this complexity when modeling the resulting X-ray emission presents quite a challenge and makes it difficult to accurately characterize the properties of the full SNR volume. We apply for the first time a novel analysis method, Smoothed Particle Inference (SPI), that can be used to study and characterize the structure, dynamics, morphology, and abundances of the entire remnant with a single analysis. We apply the method to XMM-Newton observations of the Type Ia supernova remnant DEM L71. We present histograms and maps showing global properties of the remnant, including temperature, abundances of various elements, abundance ratios, and ionization age. Our analysis confirms the high abundance of Fe within the ejecta of the supernova, which has led to it being typed as a Ia. We demonstrate that the results obtained via this method are consistent with results derived from numerical simulations carried out by us, as well as with previous analyses in the literature. At the same time, we show that despite its regular appearance, the temperature and other parameter maps exhibit highly irregular substructure which is not captured with typical X-ray analysis methods. Interestingly, we find that SPI can be used to decipher the position of the Rayleigh-Taylor unstable contact discontinuity, consistent with that derived from the hydrodynamic simulations.

Affiliation

University of Chicago

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: DWARKADAS, Vikram (University of Chicago); Dr FRANK, Kari (Northwestern CIERA); Mr PANFICHI, Aldo (University of Chicago); Mr CRUM, Ryan (Penn State University); Mr BURROWS, David (Penn State University)

Presenter: DWARKADAS, Vikram (University of Chicago)

Session Classification: POSTER SESSION

Contribution ID: **104** Type: **Poster**

CG X-1: AN ECLIPSING WOLF-RAYET ULX IN THE CIRCINUS GALAXY

Friday, September 13, 2019 3:50 PM (2 minutes)

Compact Wolf-Rayet X-ray binaries with orbital periods of less than a day are a rare class of sources, probing a short-lived (few 10^5 yr) but key evolutionary stage of binary systems. They emerge from a common envelope phase and (if they survive the second SN explosion) they form double compact objects that can merge via gravitational decay in less than a Gyr. We studied the candidate Wolf-Rayet X-ray binary CG X-1 in the Circinus galaxy, using 20 years of Chandra and XMM-Newton data. CG X-1 is an eclipsing source and one of the most luminous ULXs in the local universe (peak L_X = 3 x 10^{40} erg/s at a distance of 4.2 Mpc). We phase connected the lightcurves in the archival data and derived a period of (25,970.0 +/- 0.1) s and a period derivative Pdot/P = (10.2 +/- 4.6) x 10^{-7} yr^{-1}. The intriguing dipping and eclipsing behavior of CG X-1 is different from the orbital modulations seen in other classes of X-ray binaries. We suggest that such lightcurves are a defining property of this class of super-Eddington sources, in which both the primary and the secondary launch dense, fast outflows with similar kinetic power. We propose a model for the asymmetric dips and occultations, based on partial covering by Compton-thick clouds. We speculate that the main occulting material is dense, shocked wind between black hole and donor star, and in a bow shock ahead of the black hole.

Affiliation

National Astronomical Observatories Of China (NAOC)

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Prof. SORIA, Roberto (UCAS); Ms QIU, Yanli (National Astronomical Observatories Of China (NAOC))

Co-authors: Prof. LIU, Jifeng (NAOC); Dr WANG, Song (NAOC)

Presenter: Ms QIU, Yanli (National Astronomical Observatories Of China (NAOC))

Session Classification: POSTER SESSION

Contribution ID: **105** Type: **Poster**

Constraining the size of the corona with fully relativistic calculations of spectra of extended corona

Friday, September 13, 2019 7:08 PM (2 minutes)

The size and geometry of the X-ray emitting corona in AGNs are still not well constrained. Dovčiak & Done (2016) proposed a method based on calculations assuming a point-like lamp-post corona. To perform more self-consistent calculations of energy spectra of extended coronae, we develop monk, a Monte Carlo radiative transfer code dedicated to calculations of Comptonised spectra in the Kerr spacetime. In monk we assume Klein-Nishina scattering cross section and include all general relativistic effects. We find that for a corona located above the disc, the spectrum is not isotropic, but with harder and less luminous spectra towards observers at lower inclinations, owing to anisotropic illumination of the seed photons. This anisotropy also leads to an underestimated size of the corona if we assume the corona to be a point-like, isotropic source located on the black hole rotation axis, demonstrating the necessity of more self-consistent calculations. We also inspect the effect of motion and geometry of the corona on the emergent spectrum. Finally, we will discuss the implication of anisotropic corona emission for the reflection spectrum in AGNs as well as black hole X-ray binaries (BHXRBs).

Affiliation

Astronomical Institute, Czech Academy of Sciences

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: ZHANG, Wenda (Astronomical Institute, Czech Academy of Sciences)

Co-authors: Dr DOVCIAK, Michal (Astronomical Institute, Czech Academy of Sciences); Dr BURSA, Michal (Astronomical Institute, Czech Academy of Sciences)

Presenter: ZHANG, Wenda (Astronomical Institute, Czech Academy of Sciences)

Session Classification: POSTER SESSION

Contribution ID: **106** Type: **Poster**

X-ray Reverberation Mass Measurement of Cygnus X-1

Friday, September 13, 2019 3:28 PM (2 minutes)

Both galactic and supermassive black holes display characteristic features in their energy spectra, including an Fe Kα line and a Compton hump, that result from reprocessing of hard X-ray photons by the accretion disk. This reflected emission provides a probe of the innermost region of the accretion disk through general relativistic distortions to the line profile. However, these spectral distortions are insensitive to black hole mass, since they depend on disk geometry in units of gravitational radii. Measuring the reverberation lag resulting from the difference in path length between direct and reflected emission gives a measure of absolute photon path length differences. Therefore the length of the gravitational radius can be calibrated by a combined spectral-timing analysis, providing a means to measure black hole mass. I will present the application of our new reverberation model to RXTE data from the black hole X-ray binary Cygnus X-1. We jointly fit the time-averaged X-ray spectrum and the real and imaginary parts of the cross-spectrum as a function of energy for a range of Fourier frequencies, in order to constrain the mass of the black hole. I will show how introducing a radial ionisation profile in the disk changes our results and I will compare our reverberation mass measurement with the dynamical mass measurement of Cygnus X-1.

Affiliation

University of Amsterdam

Topic

Primary authors: Mr MASTROSERIO, Guglielmo (University of Amsterdam); INGRAM, Adam (University of Oxford); Prof. VAN DER KLIS, Michiel

Presenter: Mr MASTROSERIO, Guglielmo (University of Amsterdam)

Session Classification: POSTER SESSION

Contribution ID: **107** Type: **Contributed**

X-ray variability plane revisited: Role of obscuration

Thursday, September 12, 2019 12:55 PM (15 minutes)

Scaling relations are the most powerful astrophysical tools to set constraints to the physical mechanisms of astronomical sources and to infer properties for objects where they cannot be accessed directly. We have re-investigated one of these scaling relations using powerful type 1 Seyferts; the so-called X-ray variability plane (or mass-luminosity-timescale relation, McHardy et al. 2006). This relation links the power-spectral density (PSD) break frequency with the SMBH mass and the bolometric luminosity. We used all available XMM-Newton observations to study the PSD and spectra in short segments within each observation. This allows us to report for the first time that the PSD break frequency varies for each object, showing variations in 19 out of the 22 AGN analyzed. Our analysis of the variability plane confirms the relation between the break frequency and the SMBH mass and finds that the obscuration along the line of sight (or the variations on the obscuration using its standard deviation) is also a required parameter. We constrain a new variability plane of the form: $log(\nu_{Break}) = -Alog(M_{BH}) + Blog(N_H) - C$ (or $log(\nu_{Break}) = -Alog(M_{BH}) + B\Delta(N_H) + C$). The X-ray variability plane found by McHardy et al. (2006) is roughly recovered when we use unobscured segments. We speculate the PSD shape is related with the outflowing wind close to the accretion disk at least for these powerful type 1 AGN (Gonzalez-Martin 2018).

Affiliation

IRyA-UNAM

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr GONZALEZ-MARTIN, Omaira (IRyA-UNAM)

Presenter: Dr GONZALEZ-MARTIN, Omaira (IRyA-UNAM)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **108** Type: **Poster**

The X-ray variability of LLAGN NGC 5273

Friday, September 13, 2019 6:58 PM (2 minutes)

In this talk I present the first results regarding the X-ray variability of the nearby Low luminsity AGN NGC 5273. The source was observed with a 90 ks pointing by XMM in 2017 and was found to be significantly variable down to timescales of 1000 seconds. From the Fourier analysis it was possible to detect for the fist time the presence of reverberation lag at the iron K line of ~700 seconds. More interestingly, from the spectral analysis it was found that the source decreased it's flux of a factot of ~5 in just 3 years without showing variations in the amount of absorption. I will then pass to show all archival observations, showing how this source change significantly both it's X-ray and radio luminsity in the last 20 years.

Affiliation

University of Southampton

Topic

Primary authors: Dr VINCENTELLI, Federico (University of Southampton); MC HARDY, Ian (University of Southampton); PAHARI, Mayuk (University of Southampton)

Presenter: Dr VINCENTELLI, Federico (University of Southampton)

Session Classification: POSTER SESSION

Contribution ID: **109** Type: **Poster**

Detection of an IR burst in 4U 1728-34

Friday, September 13, 2019 2:26 PM (2 minutes)

We report for the first time the detection of X-ray burst in the IR K-band from the neutron star low mass X-ray binary 4U 1728-34. Using high time resolution IR observations we find a rapid increase of the IR emission 6 seconds after the appearance of an X-ray burst. We interpret such long delay as the light-travel time from the neutron star to the companion star surface, where the X-ray emission is reprocessed. From the value of the delay it was possible to infer a period between 3 and 8 hours, which is significantly higher from the one measured in past studies. Combining these new informations with the properties of the X ray bursts from the neutron star, I will discuss the physical implications regarding the nature of the companion star.

Affiliation

University of Southampton

Topic

Primary authors: VINCENTELLI, Federico (University of Southampton); CAVECCHI, Yuri (University of Southampton); CASELLA, Piergiorgio (INAF-OAR); MIGLIARI , Simone (ESA); DIAZ-TRIGO, Maria (ESO); BELLONI, Tomaso (INAF-Brera)

Presenter: VINCENTELLI, Federico (University of Southampton)

Session Classification: POSTER SESSION

Contribution ID: **110** Type: **Poster**

How can a magnet hide its signature line? The case of 4U 1901+03 and 2S 1417-624.

Friday, September 13, 2019 2:58 PM (2 minutes)

I present results form our analysis of recent outbursts of the Be X-ray binaries 2S 1417-624 and 4U 1901+03. Both sources enter outbursts only very rarely, but their giant outbursts in 2018 afforded us with the chance to study their accretion behaviour in detail using modern X-ray telescopes such as NuSTAR, NICER, Swift, and Chandra.
For 2S 1417-624 we updated the orbital ephemeris and find a possible super-orbital period of 82d.
For 4U 1901+03 we refined the position dramatically using Chandra, which allowed for the identification of the optical companion, i.e., the donor star and the clear classification of the source as a Be X-ray binary.
The spectra of both sources could be well described with typical phenomenological models, and we also applied recently developed physical models. These allowed us to constrain the parameters of the accretion column better. However, neither source showed a Cyclotron Resonant Scattering Feature (CRSF), so a direct measurement of the magnetic moment was not possible. However, from the strong pulsations and spectral results, magnetic fields of the order of 10^12G are implied, which often lead to the production of an observable CRSF.
I will put our findings into context with the larger sample of accreting highly magnetised neutron stars, and discuss the lack of a CRSF (despite an implied strong magnetic field) in the context of recent advances in modelling the emission profile of the accretion column.

Affiliation

ESA/ESAC

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: FUERST, Felix (ESA/ESAC); Dr KUEHNEL, Bissinger (ECAP / Uni Erlangen-Nuremberg); HEMPHILL, Paul (Massachusetts Institute of Technology); Dr KRETSCHMAR, Peter (ESA); Dr COLEY, Joel (Howard University); MALACARIA, Christian (NASA-MSFC/USRA); Dr POTTSCHMIDT, Katja (NASA-GSFC / UMBC / CRESST); Prof. WILMS, Joern (Remeis Observatory / ECAP); Dr WOLFF, Mike (NRL)

Presenter: FUERST, Felix (ESA/ESAC)

Session Classification: POSTER SESSION

Contribution ID: **111** Type: **Contributed**

Fast IR/X-ray observations from the MAXI new black-transients

Monday, September 9, 2019 3:25 PM (15 minutes)

Simultaneous O-IR / X-ray high-time resolution observations are one of the most powerful tools to study jets in Low-mass X-ray binareis. In this talk I present the latest results regarding fast-IR variabilty of the new black-hole transients which went in outburt between 2017 and today (e.g. MAXI J1535-571, MAXI J1820+070 and MAXI 1348-630). All these sources have been oberved in IR (K band) with HAWK-I with simultaneous X-ray coverage (XMM-Newton/Nustar/Nicer) at different stages of their outburst. Evidence of QPOs in both were found for all sources in both bands. Moreover I will also show and compare the different CCF measured the for these sources, discussing them in terms of models which try to explain fast O-IR variability in black-hole transients.

Affiliation

University of Southampton

Topic

Primary authors: VINCENTELLI, Federico (University of Southampton); CASELLA, Piergiorgio (INAF-OAR); MACCARONE, Tom (Texas Tech University); UTTLEY, Phil (University von Amsterdam); O'BRIEN, Kieran (Durham University); RUSSELL, Dave (NYUAD); FENDER, Rob (University of Oxford)

Presenter: VINCENTELLI, Federico (University of Southampton)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **113** Type: **Contributed**

The dependence of star formation on AGN activity and absorption

Thursday, September 12, 2019 12:40 PM (15 minutes)

Studies of recent decades have led to the conclusion that there is an inextricable link between galaxies and the Supermassive Black Holes (SMBHs) located in their centre. However, it is still unclear how the activity of the SMBH affects the properties of the host galaxy. Furthermore, there is a scientific debate whether the absorption we observe in some AGN is a geometric effect or an evolutionary phase in the galaxy's lifetime.
In my talk, I will present our results on the correlation between the SMBH activity and the SFR of the host galaxy. We use the largest (~3,500) X-ray AGN sample, from the XMM-XXL and the XMM-ATLAS fields in a wide range of redshift and luminosities. We disentangle the effects of stellar mass and redshift on the SFR and show that the AGN enhances the star formation of its host galaxy when the galaxy lies below the main sequence and quenches the star formation of the galaxy it lives in when the host lies above the main sequence. Finally, I will discuss preliminary results of our work regarding the connection between the star formation and the AGN absorption. Investigating the existence of such a correlation will shed light on the nature of the AGN absorption.

Affiliation

National Observatory of Athens

Topic

Primary author: Ms MASOURA, Vasileia Aspasia (National Observatory of Athens)

Presenter: Ms MASOURA, Vasileia Aspasia (National Observatory of Athens)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **114** Type: **Contributed**

Modeling the thermal reverberation in AGN

Wednesday, September 11, 2019 12:50 PM (15 minutes)

Several AGN have shown UV/optical variability lagging behind the X-ray emission by a few days. The simplest and most straightforward interpretation is that the variable X-ray flux from the corona illuminates the accretion disc below where it is partially reflected and observed as fast X-ray reverberation signal, and partially absorbed and thermalised in the disc, which produces a slow UV and optical reverberation signal. Since the size of the corona is very small compared to the accretion disc, and it is located in the innermost central region of AGN, it first illuminates the hottest inner parts of the accretion disc and later on its colder further out areas. Thus one expects to see the original X-ray fluctuations to be firstly followed by variations in the UV and then in the optical wavebands.
To study the thermal reverberation we have improved our X-ray reverberation KYNxilrev model to include the thermalisation of the absorbed (non-reflected) part of the incident flux. In our contribution we will discuss the results of our thermal reverberation modelling in a lamp-post corona geometry and show that the time lags observed in UV and optical wavebands are in agreement with the standard Novikov-Thorne accretion disc.

Affiliation

Astronomical Institute of the CAS

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Dr DOVCIAK, Michal (Astronomical Institute of the CAS); Dr KAMMOUN, Elias (University of Michigan); Prof. PAPADAKIS, Iossif (University of Crete)

Presenter: Dr DOVCIAK, Michal (Astronomical Institute of the CAS)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **115** Type: **Contributed**

INTEGRAL follow-up of the gravitational wave events

Monday, September 9, 2019 12:15 PM (15 minutes)

We exploit observations of the INTErnational Gamma-Ray Astrophysics Laboratory (INTEGRAL) to search for gamma-ray and hard X-ray emission associated with the gravitational wave events discovered during scientific runs of Advanced LIGO and Advanced Virgo. The highly eccentric orbit of INTEGRAL ensures high duty cycle, long-term stable background, and unobstructed view of the nearly entire sky. This enables us to use a combination of INTEGRAL instruments (SPI-ACS, IBIS/Veto, and IBIS) to constrain the fraction of energy emitted in the hard X-ray electromagnetic component for the full high-probability sky region of almost every single LIGO trigger.
For binary black-hole mergers, the fraction of the energy promptly released in gamma-rays in 75 keV–2 MeV energy range in the direction of the observer is constrained to be less than one millionth of the gravitational wave energy, in the majority of the localization region. Moreover, in the case of a favorable orientation, INTEGRAL high-energy imaging instruments, IBIS, SPI, and JEM-X, provide the unique opportunity to search also for long-lasting electromagnetic counterparts over 3 decades in energy, from 5 keV to 8 MeV.
The historical detection of GRB170817a/GW170817 demonstrated the INTEGRAL potential to detect gamma-rays from a binary neutron star merger. Besides serendipitous observations, for the third observing run, we plan to perform a very rapid follow up in case of electromagnetic loud event.

Affiliation

University of Geneva

Topic

Multi-messenger and transient astronomy

Primary authors: FERRIGNO, Carlo (University of Geneva); Prof. UBERTINI, Pietro (IASF, INAF, Rome); BOZZO , Enrico (University of Geneva); Dr SAVCHENKO, Volodymyr (University of Geneva)

Presenter: FERRIGNO, Carlo (University of Geneva)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **116** Type: **Contributed**

X-ray variability of Seyfert galaxies during transient obscuration events: the case of NGC 3783

Wednesday, September 11, 2019 12:35 PM (15 minutes)

Recent observing campaigns revealed the occurrence of "obscured states"in a few Seyfert galaxies, produced by streams of outflowing, lowly ionized gas, partially eclipsing the X-ray source. These events appear to be transient, temporarily modifying the X-ray properties of the source. The increasing number of detections suggests this might be a common phenomenon. It is therefore important to study the effects of such events on the X-ray characteristics of the source. I will report on our comparative study of the X-ray variability properties of the Seyfert galaxy NGC 3783 during unobscured and obscured states. The obscurer is found to respond to the short-time scale variations of the illuminating X-ray continuum, imprinting characteristic signatures in the spectral-timing properties of the source. These can be used to put independent constraints on the parameters of the obscuring gas.

Affiliation

N. Copernicus Astronomical Center PAN

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr DE MARCO, Barbara (N. Copernicus Astronomical Center PAN)

Co-authors: Dr ADHIKARI , Tek Prasad; Dr PONTI, Gabriele; Dr BIANCHI, Stefano; Dr CAPPI, Massimo; Dr MAO, Junjie; Dr KAASTRA, Jelle; Dr COSTANTINI, Elisa; Dr PINTO, Ciro; Dr PETERSON, Brad; Dr MEHDIPOUR, Missagh; Dr MATT, Giorgio; Dr BRANDUARDI-RAYMONT, Graziella; COSTANZO, Deborah; Dr PETRUCCI, Pierre-Olivier; Dr BEHAR, Ehud; PERETZ, Uria; Dr KASPI, Shai; Dr EBRERO, Jacobo; Dr WALTON, Dom; Dr KRISS, Jerry; Dr PALTANI, Stephane; Dr ARAV, Nahum; Dr DI GESU, Laura; Dr URSINI, Francesco; Dr DE VRIES, Cor

Presenter: Dr DE MARCO, Barbara (N. Copernicus Astronomical Center PAN)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **117** Type: **Contributed**

X-ray Binary Luminosity Function Scaling Relations for Local Galaxies Based on Subgalactic Modeling

Tuesday, September 10, 2019 10:15 AM (15 minutes)

With the detection of compact-object mergers with LIGO/VIRGO there is a resurgence in modeling efforts to understand the evolution of interacting close binaries, including X-ray binaries (XRBs). Critical high-value empirical constraints on this effort can be gained by XRB X-ray luminosity functions (XLFs), which provide many degrees of freedom for testing models. Using a sample of 38 nearby galaxies (D < 30 Mpc) that have Chandra observations (5.8 Ms total), and a wealth of FUV-to-FIR data, we characterized on subgalactic scales how the XRB XLF varies with specific-SFR (sSFR=SFR/M). We find that the XLF clearly transitions from LMXB-dominant to HMXB-dominant going from low-to-high sSFR environments, and we characterize in detail the HMXB and LMXB XLF shapes and scaling relations with SFR and M, respectively. With this rich data set, we show that the HMXB and LMXB XLFs exhibit more complex shapes and variations with sSFR than previously reported, and we find evidence for metallicity and stellar age dependences in the XLF shapes and scalings. We put into context these findings with recent studies of XRB evolution reported from the Chandra Deep Fields and COSMOS surveys, and discuss ways forward for linking studies of XRBs to other astrophysical systems (e.g., GW sources).

Affiliation

Univ of Arkansas

Topic

Primary author: Prof. LEHMER, Bret (Bret)

Co-authors: EUFRASIO, Rafael (University of Arkansas); PANAYIOTIS, Tzanavaris (NASA GSFC); BASU-ZYCH, Antara (NASA GSFC); FRAGOS, Tassos (Geneva); PRESTWICH, Andrea (Harvard CfA); YUKITA, Mihoko (Johns Hopkins University); ZEZAS, Andreas (University of Crete); HORNSCHEMEIER, Ann (NASA GSFC); PTAK, Andrew (NASA GSFC)

Presenter: Prof. LEHMER, Bret (Bret)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **118** Type: **Poster**

A sample of AGNs with known inclination angle

Friday, September 13, 2019 7:10 PM (2 minutes)

The cosmic X-ray background (CXB), the diffuse X-ray emission observed between 0.5 keV and 300 keV, is thought to be mainly produced by obscured and unobscured active galactic nuclei (AGNs). According to the historical AGN unified model, different types of AGNs are obscured by a structure of gas and dust named torus but with different inclination angle. With the successful launch of the high-resolution X-ray observatories in recent decades, more and more physically motivated models with different assumptions were developed to study these excellent spectra of AGNs. Nevertheless, the physical and geometrical properties of the obscuring torus are still quite unclear, due to the complexity of the models and the limited number of the sources with high-quality X-ray spectra. In this presentation, I will introduce the results of a sample of AGNs with high-quality data of NuSTAR, XMM-Newton and Chandra. All the sources in the sample have foreknown inclination angle measured in optical, which could give better constraints on the information of the obscuring torus, especially the geometrical properties of the torus.

Affiliation

Clemson university

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Mr ZHAO, Xiurui (Clemson University); MARCHESI, Stefano (Clemson University); Dr AJELLO, Marco (Clemson university)

Presenter: Mr ZHAO, Xiurui (Clemson University)

Session Classification: POSTER SESSION

Contribution ID: **119** Type: **Poster**

Spectral and temporal properties of thermal Comptonization in X-rays

Friday, September 13, 2019 4:20 PM (2 minutes)

Comptonization by thermal electrons at mildly relativistic temperatures appears to be one of the major radiative processes giving rise to the observed X-ray emission from accretion onto compact objects. This is evidenced by ubiquitous high-energy cutoffs in hard spectral states occuring at E>kT, which are usually well fitted by models of that process. Accurate determination of the electron temperature is important for proper understanding of the physical nature of the source, in particular for determination of the role of electron-positron pair production. Some of the existing codes, in particular 'nthcomp', underestimate kT already in the mildly relativistic regime. Here we develop a new and much more accurate public code, 'thcomp', based on a modification of the Kompaneets equation with an escape term. The accuracy of that code and of other available ones is tested using our new public Monte Carlo code, 'compton'. Using the latter, we also study timing properties of Comptonization, in particular the distribution of photon arrival times and the evolution of the average photon energy.

Affiliation

N. Copernicus Astronomical Center, Warsaw, Poland

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr ZDZIARSKI, Andrzej (N. Copernicus Astronomical Center)

Co-authors: Dr SZANECKI, Michał (Nicolaus Copernicus Astronomical Center PAS); GIERLINSKI, Marek; BIERNACKI, P.

Presenter: Mr ZDZIARSKI, Andrzej (N. Copernicus Astronomical Center)

Session Classification: POSTER SESSION

Contribution ID: **120** Type: **Poster**

Polarimetry of GRS 1915+105 in thermal state with the future IXPE mission

Friday, September 13, 2019 8:12 PM (2 minutes)

I will summarize our recent results on X-ray polarization simulations
for the X-ray binary GRS 1915+105 in thermal state with the aim
to assess the capability of the future X-ray polarimetry measurements
to put independent constraints on black hole spin and orientation of the system.
For this purpose, we simulate X-ray polarimetric properties of GRS 1915+105
for the planned Imaging X-ray Polarimetry Explorer (IXPE) satellite.
For the simulations, we employ our recently developed KYNBB code to calculate
the Stokes parameters using a multicolor black body emission model
accounting for thermal radiation from the disk accretion (Dovčiak et al., 2008).
We will present our results of the fitting analysis of the simulated data to show
the precision of constraints on black hole spin and orientation for different
exposures of the planned observation.

Affiliation

Astronomical Institute of the Czech Academy of Sciences | Institute of Theoretical Physics of the Charles University

Topic

Future missions

Primary author: MIKUŠINCOVÁ, Romana (Astronomical Institute of the Czech Academy of Sciences | Institute of Theoretical Physics of the Charles University)

Co-authors: SVOBODA, Jiří; Dr DOVCIAK, Michal (Astronomical Institute, Czech Academy of Sciences); DI LALLA, Niccolo (INFN | University of Pisa)

Presenter: MIKUŠINCOVÁ, Romana (Astronomical Institute of the Czech Academy of Sciences | Institute of Theoretical Physics of the Charles University)

Session Classification: POSTER SESSION

Contribution ID: **121** Type: **Poster**

On the origin of steep emissivity profiles in AGN accretion discs

Friday, September 13, 2019 5:50 PM (2 minutes)

X-ray observations suggest high compactness of coronæ in active galactic nuclei as well as in X-ray binaries. The compactness of the source implies a strong radial dependence in the illumination of the accretion disk. This will, for any reasonable radial profile of the density, lead to a radial profile of the disk ionization. Thus, an artificial increase of the radial emissivity parameter can be seen by assuming a radially structured ionization profile of the disk. We have investigated the effect of radial ionization profiles on the observed X-ray spectra and quantified it for a wide range of parameters. In this talk, I will present the results obtained from simulations which were carried out with the current state-of-the-art models for relativistic reflection. We simulated spectra using the response files of the microcalorimeter X-IFU, which is planned to be on board of Athena. We assumed typical parameters for X-ray bright Seyfert-1 galaxies and considered two scenarios for the disk ionization: (1) a radial profile for the disk ionization and (2) a constant disk ionization. Our results suggest that steep emissivity profiles can be indeed achieved due to the radial profile of the disk ionization, which becomes more important for the cases where the corona is located at low heights above the black hole and this effect may even be more prominent than the geometrical effects. We also discuss how this might affect black hole spin measurements.

Affiliation

University of Michgan

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr KAMMOUN, Elias (University of Michigan)

Co-authors: Mr DOMCEK, Vladimir (Anton Pannekoek Institute / GRAPPA, University of Amsterdam); SVOBODA, Jiří; Dr DOVCIAK, Michal (Astronomical Institute, Czech Academy of Sciences); Prof. MATT, Giorgio (Università Roma Tre)

Presenter: Dr KAMMOUN, Elias (University of Michigan)

Session Classification: POSTER SESSION

Contribution ID: **122** Type: **Poster**

A hard look at local Seyfert 2 galaxies with NuSTAR

Friday, September 13, 2019 5:52 PM (2 minutes)

Current measurements show that the observed fraction of Compton-thick (CT) active galactic nuclei (AGN) is smaller than the expected values needed to explain the cosmic X-ray background. Thanks to its unprecedented sensitivity covering the 3 - 79 keV band, NuSTAR is playing a key role in identifying the missing fraction of these sources and determining their properties. In this talk, I will present the first results of the "NuSTAR Obscured Seyferts Survey"aiming to study an optically-selected volume-limited sample of 22 Seyfert-2 galaxies that were identified in the CfA Redshift Survey. This NuSTAR legacy survey will allow us to accurately measure the obscuring column densities, Eddington fractions and other fundamental properties of these sources. This would be accomplished by using physically motivated spectral models to fit the X-ray spectra of these obscured sources, which will additionally provide better insights on the geometry of the obscuring material. I will introduce the sample, describe the various spectral models employed in this work, and discuss the physical implications of our results. I will also discuss how future high-resolution X-ray observatories such as XRISM and Athena will improve our understanding of CT AGN in the soft X-rays.

Affiliation

University of Michgan

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Dr KAMMOUN, Elias (Univesity of Michigan, Ann Arbor, USA); Prof. MILLER, Jon (University of Michigan)

Presenter: Dr KAMMOUN, Elias (Univesity of Michigan, Ann Arbor, USA)

Session Classification: POSTER SESSION

Contribution ID: **124** Type: **Poster**

Universal detection of high-temperature emission in X-ray isolated neutron stars

Friday, September 13, 2019 4:18 PM (2 minutes)

X-ray Isolated Neutron Stars (XINSs) are nearby, strongly magnetized, thermally emitting neutron stars without non-thermal emission in any energy band, from radio to Gamma-ray. So far, only seven XINSs discovered by ROSAT are known. Since the discovery in 1990s, their X-ray spectra have been interpreted simply with a single-temperature blackbody (1BB) model.
Stacking all the data observed with XMM-Newton, we find that the brightest XINS, RX J1856.5-3754, shows high-temperature emission, "keV-excess", over the 1BB model (Yoneyama et al. 2017, PASJ 69, 51). We then search for the similar excess emission in the other six XINSs and find that all the six show the keV-excess (Yoneyama et al. 2019, PASJ 71 17). Their X-ray spectra including the keV-excess are universally reproduced with a two-temperature blackbody model. Five out of seven sources show similar spectral parameters with those of magnetars. For the other two sources, the emission mechanism of the keV-excess can be understood as emission from rotating polar caps. We discuss the similarity between the XINSs and magnetars and the possibility to determine the mass and radius of neutron stars using the keV-excess.

Affiliation

Osaka University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: YONEYAMA, Tomokage (Osaka University)

Co-authors: Mr HAYASHIDA, Kiyoshi (Osaka University); Dr NAKAJIMA, Hiroshi (Kanto Gakuin University); Prof. MATSUMOTO, Hironori (Osaka University)

Presenter: YONEYAMA, Tomokage (Osaka University)

Session Classification: POSTER SESSION

Contribution ID: **125** Type: **Poster**

X-ray Imaging Polarimetry with a 2.5 um Pixel CMOS Sensor for Visible Light at Room Temperature

Friday, September 13, 2019 8:02 PM (2 minutes)

We demonstrate that a CMOS pixel sensor with a pixel size of 2.5 μm can work as a photo-electron tracking X-ray polarimeter. Although it is designed for visible light by GPixel Inc., we succeed in detecting X-ray photons with an energy res- olution of 176 eV @5.9 keV (FWHM) at room temperature. This performance is remarkable considering that conventional X-ray CCD detectors need to be cooled down to −100◦C to detect X-rays in the photon counting mode. We irradiate a polarized X-ray beam to this CMOS sensor with various rotation angles in SPring-8, the synchrotron radiation facility in Japan, to evaluate its polarimetry sensitivity. Modulation factors obtained from the number ratio of the double pixel events with different split directions are 7.63 ± 0.07% and 15.5 ± 0.4% at 12.4 keV and 24.8keV, respectively. These results show this CMOS sensor can measure X-ray polarization with the highest spatial resolution ever. We discuss possible applica- tions for future missions of this type of sensors.

Affiliation

Osaka University

Topic

Future missions

Primary author: ASAKURA, Kazunori (Osaka University)

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Presenter: ASAKURA, Kazunori (Osaka University)

Session Classification: POSTER SESSION

Contribution ID: **128** Type: **Poster**

X-ray observations of IR selected AGN

Friday, September 13, 2019 5:34 PM (2 minutes)

We study the X-ray properties (using XMM-Newton) of mid-infrared (mid-IR) selected AGN. For that purpose, we use WISE sources
in the Stripe82-XMM area to identify mid-IR AGN candidates, applying the Assef et al. criteria. . XMM-Newton observations cover 26 deg2. Our sample consists of 1946 IR AGN candidate and about 1/3 is detected in X-rays. 1507 have SDSS detection and 824 sources have optical spectra. We also use optical to mid-IR photometry to construct Spectral Energy Distribution
(SED) for the 1507 IR AGN with SDSS detection. The SED analysis indicates that only 1/3 of the sources are type-1 based on the inclination angle. Previous studies have found a correlation between optical/IR colours (r-W2) and AGN obscuration. The AGN population detected by SDSS presents two peaks in the r-W2 distribution while the X-ray detected sources do not cover
the second redder r-W2 peak. Therefore, it appears that at the X-ray fluxes depth probed, X-rays miss the most optically absorbed sources. We apply X-ray spectral fitting to estimate the obscuration (NH) for the ~500 X-ray detected AGN
and we compare with the obscuration found by the SED method.

Affiliation

National Observatory of Athens

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Dr RUIZ, Angel (NOA); Dr MOUNTRICHAS, George (NOA); Dr GEORGANTOPOULOS, Ioannis (NOA)

Presenter: Dr GEORGANTOPOULOS, Ioannis (NOA)

Session Classification: POSTER SESSION

Contribution ID: **129** Type: **Poster**

A broad-band analysis of GRS 1758-258 using long-term spectra collected by the INTEGRAL satellite

Friday, September 13, 2019 2:56 PM (2 minutes)

GRS 1758-258 is a bright and persistent hard X-ray source discovered in 1990. It is a low mass X-ray binary whose companion star nature remains uncertain due to the system's location close to the galactic centre and the large interstellar absorption. The presence of a double-sided jet points towards a microquasar character of the source. Frequent observations of GRS 1758-258 by the INTEGRAL satellite since 2003 resulted in a large data set in the 3-400 keV band. Using the 22-100 keV spectra summed over each satellite orbit (~3 days) we characterized an overall variability of the source in terms of the flux and spectral slope. Whereas the 22-100 keV flux varies by more than order of magnitude, the photon index remains very stable and concentated around the value 1.7, with a tendency towards steeper spectra seen only for a few periods of very low flux levels.
For a deeper study of the GRS 1758-258 emission with a physical model we prepared four broad-band (3-400 keV) spectral sets summed according to the level of the orbital flux. These spectra were analyzed with a hybrid Comptonization model allowing us to characterize the plasma region in the system centre. Our results show that the plasma is photon-starved, with relatively low energy of the seed photons. Together with the presence of weak Compton reflection these findings are consistent with the truncated acrretion disc model. In addition, we found that the spectra are affected by a strong, local absorption. The three higher flux spectra sets exhibit similar properties. On the other hand, the low flux state emission is less absorbed and strongly reduced above 200 keV.
Finally, we compare our results with those found for other black hole systems, persistent and transient.

Affiliation

University of Zielona Gora

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: FILOTHODOROS, Alexandros (University of Zielona Gora); LUBINSKI, Piotr (University of Zielona Góra, Institute of Physics)

Presenter: FILOTHODOROS, Alexandros (University of Zielona Gora)

Session Classification: POSTER SESSION

Contribution ID: **130** Type: **Poster**

X-ray Spectroscopy and Polarimetry of Black Hole X-ray Binaries (BHXBs)

Friday, September 13, 2019 8:20 PM (2 minutes)

X-ray Polarimetry will open a new window in X-ray Astronomy that can revolutionize the current understanding of the accretion and ejection mechanisms of black holes X-ray binaries (BHXBs).. With the upcoming launch of the Imaging X-ray Polarimetry Explorer (IXPE) in 2021, X-ray astronomy will be benefited with the additional Polarimetry signal along the currently existing timing and spectroscopic analysis. Since BHXBs are highly variable in time, the polarimetry signals might also vary depending upon various intrinsic properties. So, it is necessary to have a thorough spectral and timing analysis of different states of the source. In my PhD work we are performing a spectroscopic analysis of different states of the well known Low Mass X-ray Binary GRS 1915+105 and we will check how the polarimetric signal varies in different states. We have found strong evidence of an accretion disk wind using the Chandra HETGS spectra, and we are modeling it using both Xstar and the MHD as in the case of accretion disk winds in GRO J1655-40 (Fukumura et al 2017). We further simulated the modulation factor and angle as to be seen by IXPE using the ixpeobsim simulator for the different states of GRS 1915+105. We plan to extend the same analysis for other X-ray binaries like Cygnus X-1, Cygnus X-3 etc.

Affiliation

University of Rome “Tor Vergata”

Topic

Future missions

Primary authors: Mr RATHEESH, Ajay (University of Rome ”Tor Vergata”); TOMBESI, Francesco (University of Rome ”Tor Vergata”); SOFFITTA, Paolo (Istituto Nazionale di Astrofisica (INAF))

Presenter: Mr RATHEESH, Ajay (University of Rome ”Tor Vergata”)

Session Classification: POSTER SESSION

Contribution ID: **132** Type: **Poster**

X-ray analysis of the accreting supermassive black hole in the radio galaxy PKS 2251+11

Friday, September 13, 2019 6:36 PM (2 minutes)

The launch and the propagation of relativistic outflows from supermassive black holes is one of the main unresolved issues in the field of active galactic nuclei (AGNs). Radio galaxies are optimal candidates for a multi-wavelength study of the connection between accretion phenomena and the ejection of energetic outflows. In this regard, we focus on the active galaxy PKS 2251+11, a particularly bright broad line radio galaxy, for which we have investigated the structure, kinematics and physical state of the nuclear environment, through an X-ray spectral and temporal analysis of an XMM-Newton observation. The results are interpreted in light of the unified model of AGNs, comparing the accretion properties of PKS 2251+11 with the larger class of radio-quiet Seyfert galaxies.

Affiliation

Gran Sasso Science Institute, Viale F. Crispi, 7 67100 L'Aquila (IT)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: RONCHINI, Samuele

Co-authors: TOMBESI, Francesco (University of Rome "Tor Vergata"); VAGNETTI, Fausto (Istituto Nazionale di Astrofisica (INAF)); Dr PANESSA, Francesca (Istituto Nazionale di Astrofisica (INAF)); BRUNI, Gabriele (Istituto Nazionale di Astrofisica (INAF))

Presenter: RONCHINI, Samuele

Session Classification: POSTER SESSION

Contribution ID: **134** Type: **Poster**

Using Fourier Resolved Spectroscopy to probe the X-ray variabilitty of the BHC Swift J1753.5-0127

Friday, September 13, 2019 4:24 PM (2 minutes)

Swift J1753.5-0127 (J1753 hereafer) is a Low Mass X-ray Binariy (LMXB) hosting a Black Hole of ~3 solar masses (BHC), with a very short orbital period of around 3 hrs. The source exhibited an unusually long outburst cycle which lasted for approximately 12 years between 2005 and 2017 before returning to quiescence. We have obtained and analyzed multi-epoch series of archival data from XMM-Newton, NuStar, the Neils Gherels Observatory (previously known as Swift) to search for temporal and spectral variability along different phases of the long outburst. The outcome of the analysis reveals a rich spectra variability behavior. In addition, thanks to the brightness of the X-ray source, we have been able to perform Fourier Resolved Spectroscopy (FRS). The FRS spectra indicate the presence of a weak (though prominent) broad and variable Fe-like feature, around 6.4 keV, in the spectra of J1753. Interpretations of the spectral changes assuming a variable accretion flow to the BH and the weak presence of the iron line are discussed.

Affiliation

University of Sharjah/Sharjah Academy for Space Sciences and Technology

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: MANOUSAKIS, Antonios (University of Sharjah/Sharjah Academy of Space Science and Technology); Dr IOANNOU, Zach (Sultan Qaboos University, Oman); Mrs SALAMA , Al-Hinaia (Sultan Qaboos University, Oman)

Presenter: MANOUSAKIS, Antonios (University of Sharjah/Sharjah Academy of Space Science and Technology)

Session Classification: POSTER SESSION

Contribution ID: **135** Type: **Poster**

Nuclear activity in nearby quasars

Friday, September 13, 2019 5:54 PM (2 minutes)

Nuclear activities of 67 nearby quasars show the bolometric correction factor is correlated with their accretion rate, both in infrared (IR), optical, and X-ray. We present a comprehensive study of the full AGN intrinsic spectral energy distributions (SEDs) of 67 redshift < 0.5 quasars selected from the Palomar-Green sample, using spectroscopies from XMM-Newton, HST , SDSS and photometric measurements from the Optical Monitor (OM) of XMM-Newton . The properties of the underlying accretion disc are studied after the proper subtraction from emission lines, pseudo-continuum and host galaxy. By imposing more physical conditions for the modeling, this approach can estimate the black-hole accretion rate more robustly, which is crucial to study the coevolution of black holes and galaxies.

Affiliation

Kavli Institute for Astronomy and Astrophysics

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr RUANCUN, Li (Kavli Institute for Astronomy and Astrophysics)

Co-authors: Prof. LUIS C., Ho (Kavli Institute for Astronomy and Astrophysics); Prof. RICCI, Claudio (Universidad Diego Portales (UDP))

Presenter: Mr RUANCUN, Li (Kavli Institute for Astronomy and Astrophysics)

Session Classification: POSTER SESSION

Contribution ID: **137** Type: **Poster**

X-ray winds with the WINE model: a detailed photoionization treatment of relativistic outflows in quasars

Friday, September 13, 2019 5:58 PM (2 minutes)

Ultra-fast outflows (UFO) in the X-ray band are now observed in about half of of active galactic nuclei (AGN). They are likely launched at accretion disk scales with relativistic speeds (around 0.1-0.3 c), and can reach a very high mechanical power. However, up to now very little is known about the physics behind these extreme phenomena, including the launching mechanisms and their geometry. So far, mostly absorption profiles have been modeled and compared with observations.

To gain new insights from the data, we developed a new spectral model describing both absorption and emission from a photoionized wind. A first version of the model has been applied to the UFO in the nearby ($z = 0.184$) and luminous ($L_{bol} = 10^{47} erg/s$) quasar PDS456 (Luminari et al. 2018), with promising results.
Particular attention is devoted to the wind kinematic and geometry, including the covering fraction and the inclination of the wind with respect to the line of sight. Moreover, the radiative transfer code XSTAR, which is now included in the model, allows us to take accurately into account the photoionization equilibrium of the wind with respect to its density and velocity profiles.
Relativistic effects have also been modeled carefully, using a first-principle approach. This leads to a sensitive improvement of the simulated spectra already for moderate outflowing velocities ($\approx 0.01c$), and generates important effects for high UFO velocities of $\approx 0.1 - 0.2c$.
The spectral diagnostics of the model will allow to fully exploit the unprecedented energy resolution of the upcoming X-ray observatories XRISM and ATHENA.
This work is done in collaboration with Prof. F. Tombesi and F. Vagnetti (Univ. of Rome "Tor Vergata), Dr. E. Piconcelli (INAF - Rome), Prof. K. Fukumura (J. Madison University, USA) and Dr. D. Kazanas (GSFC/NASA, USA).

Affiliation

University of Rome "Tor Vergata" and INAF - Rome Observatory

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: LUMINARI, Alfredo (University of Rome "Tor Vergata")

Co-authors: Dr KAZANAS, Demosthenes (NASA/GSFC); PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF)); VAGNETTI, Fausto (Istituto Nazionale di Astrofisica (INAF)); TOMBESI, Francesco (University of Rome "Tor Vergata"); Prof. FUKUMURA, Keigo (J. Madison University, USA)

Presenter: LUMINARI, Alfredo (University of Rome "Tor Vergata")

Session Classification: POSTER SESSION

Contribution ID: **138** Type: **Poster**

What makes clumpy obscuration and X-ray occultation events?

Friday, September 13, 2019 2:00 PM (2 minutes)

Most active galactic nuclei are seen through thick circum-nuclear gas and dust. Also, these column densities vary on time scales of days to years, indicating that the obscurer is made from clumps. We present the first clumpy obscurer model that reproduces eclipse events and column density distributions. We developed a new, open-source Monte Carlo code, XARS, to X-ray illuminate arbitrary geometries, including warped disks, outflowing winds and clump arrangements, and produce high S/N X-ray spectra for XSPEC for these. Preliminary fits show good agreement with NuSTAR spectral observations of some nearby AGN. I will demonstrate how the eROSITA survey will be able to systematically monitor millions of AGN on year-time scales for occultation events, probing the granularity of the obscuring medium.

Affiliation

MPE

Topic

Multi-messenger and transient astronomy

Primary author: Dr BUCHNER, Johannes (MPE)

Presenter: Dr BUCHNER, Johannes (MPE)

Session Classification: POSTER SESSION

Contribution ID: **139** Type: **Contributed**

Water maser emission in hard X-ray selected AGN

Wednesday, September 11, 2019 11:55 AM (15 minutes)

Water megamaser emission is powerful in tracing the inner region of active nuclei, mapping accretion disks and providing important clues on their absorption properties. From the broad band X-ray spectra of AGN it is possible to estimate the intrinsic power of the central engine and the obscuring column density. The synergy between X-ray and water maser studies allows to tackle the AGN inner physics from different perspectives. For a complete sample of AGN selected in the 20-40 keV energy range, we have investigated the presence of water maser emission and its connection to the X-ray emission, absorption and accretion rate. The hard X-ray selection of the sample results in a water maser detection rate much higher than that obtained from optically-selected samples, the nature of such evidence is here discussed.

Affiliation

INAF IAPS

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: PANESSA, Francesca (Istituto Nazionale di Astrofisica (INAF))

Presenter: PANESSA, Francesca (Istituto Nazionale di Astrofisica (INAF))

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **140** Type: **Contributed**

Model-independent limits on the abundance of SMBH

Thursday, September 12, 2019 9:45 AM (15 minutes)

The formation channels of Supermassive Black holes (SMBHs) seeds are currently debated, as are their accretion limits, growth and co-evolution with galaxies. Independent of these questions, we investigate the occurance of SMBH seeds with a simple generic framework. We consider that when halos outgrow a mass threshold, a fraction of them have formed black holes. Following the well-understood hierarchical growth of dark matter haloes in modern cosmological N-body simulations, we expose the link of z~0 occupation fraction observations to z~6 quasar space densities. The fraction of SMBHs triggered to shine as quasars or Active Galactic Nuclei is minuscule at all redshifts. Our analysis unveils (1) how to constrain masses and histories of z~6 quasar hosts by galaxy clustering, (2) why published claims have been contradictory so far and (3) how gravitational wave event distributions will constrain the processes leading from the merging of galaxies to the merging of their SMBH.

Affiliation

MPE

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr BUCHNER, Johannes (MPE)

Presenter: Dr BUCHNER, Johannes (MPE)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **141** Type: **Contributed**

Fast spectral evolution in a new tidal disruption event

Monday, September 9, 2019 2:55 PM (15 minutes)

When a star is disrupted by a super-massive black hole (SMBH), the stellar debris returns to the black hole at a rate which exceeds the Eddington accretion rate in the majority of cases and can cause a large X-ray flare. The X-ray emission from the resultant thick disk, shares characteristics with that seen from highly-accreting, low black hole mass (10^5 to 10^7 solar masses), AGN; namely soft, or steep, emission and ionised outflows. The spectrum generally evolves slowly in these events, with thermal emission softening further as the accretion rate drops, while a hard tail forms due to the creation of a low-temperature electron, compton-upscattering, region. In most events it is hard to separate these components due to the quickly diminishing flux and ambiguity caused by wind-driven absorption features.
We report here on a recently discovered event whose evolution has been unusually rapid and has allowed us to observe for the first time the creation of a comptonising region, on a timescale of one week, and to disentangle the more gradual cooling of the disk. The decay of the X-ray flux by a factor 1000 over one year can be shown to be intrinsic to the source, rather than due to absorption, thanks to the combined power of XMM-Newton and NuSTAR. Implications for the creation and destruction of comptonising regions above disks in all SMBH systems are explored.

Affiliation

TPZ-Vega, XMM-Newton SOC, ESAC

Topic

Multi-messenger and transient astronomy

Primary authors: Mr SAXTON, Richard (XMM SOC, ESAC); KOMOSSA, S. (MPIfR); Dr READ, Andrew (University of Leicester); Dr ALEXANDER, Kate D. (Northwestern University - CIERA); FUERST, Felix (ESA/ESAC)

Presenter: Mr SAXTON, Richard (XMM SOC, ESAC)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **142** Type: **Poster**

Accretion and ejection mechanisms in active galactic nuclei: the SKA and Athena synergy

A rich phenomenology of jets, winds, and accretion states has been observed in both active galactic nuclei (AGN) and X+ray binaries (XRBs), suggesting a connection between the accretion and ejection flows at different black hole masses, from supermassive down to stellar mass. In AGN, the radiation field from the disk and the outflows, both of winds and jets, are thought to play a fundamental role in the feedback invoked in galaxy formation and evolution. Notwithstanding their importance, our knowledge of the accretion and ejection phenomena and their interplay is still very limited. Single+object and population studies can explore the accretion/ejection mechanism in XRBs and AGN. The Athena X+ray observatory will be launched when the complete SKA array will be fully operative. The combination of these two facilities will provide fundamental improvements on several topics, revolutionizing our comprehension of the accretion/ejection phenomena at all scales (spatial, mass, radio power). The Athena+SKA synergy will allow us to disentangle the jet/disk flows based on their different contributions to the overall spectral energy distribution, expected to be different in ADAF, ADAF+jet and standard disk/corona models. The superbe SKA and Athena sensitivities will lead to high temporal resolution, allowing to test the coronal emission models where reconnection events produce relativistic electrons, which may produce both the radio and the X+ray emission, leading to correlated variability. Given the large number of AGN that SKA will observe/detect, it will be possible to reconstruct all the AGN accretion phases in the local Universe, from pure ADAF, to ADAF+jet dominated, to accretion efficient regimes.

Affiliation

INAF IAPS

Topic

Future missions

Primary author: PANESSA, Francesca (Istituto Nazionale di Astrofisica (INAF))

Presenter: PANESSA, Francesca (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **143** Type: **Contributed**

The X-ray properties of the z~6 quasars

Thursday, September 12, 2019 3:40 PM (15 minutes)

More than 200 quasars (QSOs) with spectroscopic redshift z > 6 have been discovered so far. Multi-wavelength observations showed that these objects are evolved systems with large black hole masses (10^8—$10^{10} M_\odot$), and that their broad-band spectral energy distributions (SEDs) and rest-frame UV spectra have not significantly evolved over cosmic time.
The formation of their Super Massive Black Holes in less than 1 Gyr is still a challenge for theory, with many simulations claiming they formed at the center of primordial overdense regions.
I will present a study of all the 29 z~6 QSOs observed so far in the X-rays, showing that the X-ray spectral properties of high-z QSOs do not differ significantly from those of QSOs at lower-z.
I will also present the results from a deep 500 ks Chandra observation of the field around z=6.31 QSO SDSS J1030+0524, which shows the best evidence of an overdense region around a z~6 QSO. This is the deepest X-ray observation ever achieved for such a distant QSO. Comparing our results with those from previous XMM observation we found a hardening of the X-ray spectrum and a decrease of the flux by a factor 2.5. This is the first evidence of a variable QSO at such high redshift. I will discuss possible interpretations for the observed variability and discuss prospects for future X-ray observations of distant QSOs.

Affiliation

INAF-OASBo

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: NANNI, Riccardo (Istituto Nazionale di Astrofisica (INAF))

Co-authors: GILLI, Roberto (Istituto Nazionale di Astrofisica (INAF)); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna)

Presenter: NANNI, Riccardo (Istituto Nazionale di Astrofisica (INAF))

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **144** Type: **Contributed**

Transient sources in the XMM-Newton catalogue

Monday, September 9, 2019 3:10 PM (15 minutes)

XMM-Newton's large field of view and excellent sensitivity have resulted in hundreds of thousands of serendipitous X-ray detections, all publicly available in the latest version of the catalogue, 3XMM-DR8. Amongst these detections, many variable sources have been identified, including gamma-ray bursts, cataclysmic variables, supernova, magnetars, X-ray binaries and tidal disruption events. I will present new and rare variable sources identified in the catalogue. I will also present some innovative methods being developed to identify new transients rapidly, as well as presenting the forthcoming catalogue version, 4XMM-DR9.

Affiliation

IRAP

Topic

Multi-messenger and transient astronomy

Primary author: Prof. WEBB, Natalie (IRAP)

Presenter: Prof. WEBB, Natalie (IRAP)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **146** Type: **Contributed**

The connection between optical and X-ray accretion disc winds in black-hole transients

X-ray observations performed during the last few decades have provided a rich data base on black-hole X-ray binaries. A strong coupling between the properties of the accretion flow and the presence of outflows, such as radio-jets and hot X-ray winds, has been found to be a fundamental characteristic of their powerful outbursts.
Since 2015 we have discovered optical accretion disc winds in several black hole transients [Muñoz-Darias et al. 2016 (Nature), 2017, 2018, 2019]. Here, I will present high-quality spectroscopic observations of several black hole transients in outburst, which reveal that cold winds with terminal velocities up to 3000 km/s are a common feature in these objects. I will discuss the impact and nature of these winds, with great emphasis on their relation with the hotter outflows observed in X-rays and the radio-jets.

Affiliation

Instituto de Astrofisica de Canarias

Topic

Multi-messenger and transient astronomy

Primary author: Dr MUÑOZ-DARIAS, Teo (Instituto de Astrofisica de Canarias)

Presenter: Dr MUÑOZ-DARIAS, Teo (Instituto de Astrofisica de Canarias)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **147** Type: **Poster**

Calibrating ESA's Athena mission

Friday, September 13, 2019 8:04 PM (2 minutes)

ESA's Athena mission is due for launch in the early 2030's. The calibration of its optics and instruments is, nevertheless, already subject of several studies and plans. This poster summarises the current calibration baseline of the telescope, the X-IFU micro-calorimeter, and the Wide-Field Imager.

Affiliation

ESA/ESTEC

Topic

Future missions

Primary authors: Dr DE BRUIJNE, Jos (ESA/ESTEC); Dr FREYBERG, Michael (MPE); Dr PAJOT, Francois (IRAP); Dr PARESCHI, Giovanni (INAF); Dr RAU, Arne (MPE); Dr WILLINGALE, Richard (University of Leicester)

Presenter: Dr DE BRUIJNE, Jos (ESA/ESTEC)

Session Classification: POSTER SESSION

Contribution ID: **148** Type: **Poster**

The jet-disc connection in gamma-ray-emitting narrow-line Seyfert 1 galaxies: the X-ray view

Before the launch of the Fermi satellite only two classes of AGN were known to generate relativistic jets and thus to emit up to the gamma-ray energy range: blazars and radio galaxies, both hosted in giant elliptical galaxies. The discovery by the Large Area Telescope on-board the Fermi satellite of variable gamma-ray emission from a few radio-loud narrow-line Seyfert 1 galaxies (NLSy1) revealed the presence of an emerging third class of AGN with relativistic jets. NLSy1 are usually hosted in late-type galaxies with relatively small black hole masses. This finding opened new challenging questions about the nature of these objects, the jet-disc connection, the emission mechanisms at high energies, and the formation of relativistic jets.

High quality spectra obtained by XMM-Newton are fundamental to determine if the X-ray spectrum of these sources is completely dominated by the jet emission or there is some contribution from the accretion flow, such as the soft X-ray excess and the Fe K line. NuSTAR observations provide a complementary coverage in the hard X-ray part of their spectrum.
In addition, thanks to the analysis of Swift and XMM-Newton data collected between 2008 August and 2019 March, we investigate the spectral and flux variability of gamma-ray-emitting NLSy1 on different time-scales and the connection with the gamma-ray emission observed by Fermi-LAT and the optical and UV emission observed by Swift-UVOT and XMM-OM. Moreover, the circumnuclear environment of these NLSy1 could potentially provide a wealth of information on the radiative and mechanical feedback. Both feedback modes can be investigated through emission and absorption features arising in the X-ray spectrum. The high-resolution spectroscopic capability of XMM-Newton will be further exploited searching for such features in the spectra of gamma-ray-emitting NLSy1.

In this talk we discuss the results of the analysis of XMM-Newton, NuSTAR, and Swift data available for the nine gamma-ray-emitting NLSy1 detected by Fermi-LAT so far and we study the relation between accretion flow and jet, and the emission mechanisms at work in these NLSy1. Finally, the X-ray properties of the gamma-ray-emitting NLSy1 will be compared to what was observed in gamma-ray-emitting radio galaxies and blazars.

Affiliation

INAF - IRA Bologna

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: D'AMMANDO, Filippo (Istituto Nazionale di Astrofisica (INAF)); LARSSON, Josefin; Dr ORIENTI, Monica (INAF-IRA Bologna); TORRESI, Eleonora (Istituto Nazionale di Astrofisica (INAF)); Dr RAITERI, Claudia (INAF-OATo); GIROLETTI, Marcello (Istituto Nazionale di Astrofisica (INAF))

Presenter: D'AMMANDO, Filippo (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **149** Type: **Contributed**

Multiple Image X-ray Interferometer Modules (MIXIM) and their Scalable Mission Plans from Sub-arcsecond to Subsub-arcsecond Resolution X-ray Images

Thursday, September 12, 2019 6:05 PM (15 minutes)

We have invented a new type of X-ray interferometers, MIXIM, which simply consists of a grating (multiple slits) and a pixel detector. This configuration provides X-ray images as multiple slit camera can do. If we employ a grating of a pitch d of 5micrometer, and opening fraction f of 0.2 separated from the detector by the distance z of 50cm, we expect the image width of 0.4". It suggests that Chandra resolution is possible with very small satellites. In reality, diffraction blurrs the image significantly. Nevertheless, by selecting X-ray events of which X-ray energy satisfies the Talbot interference condition, we expect a sharp image of the X-ray light source convolved with the multiple slits(Hayashida+2016).
We irradiated parallel X-ray beam to our MIXIM system and succeeded in obtaining the image of the source of which image width corresponding to sub-arcsecond(Hayashida+2018). We show the latest experimental results, including the best image width of 0.26"for z of 184 cm and 0.55"with z of 46 cm, and the reasonable band width of the MIXIM of 10%. Our first motivation of the MIXIM is for very small satellites. We, however, show the MIXIM is scalable in terms of z and d. MIXIM with z of 10 m (parasites to typical X-ray observatory) can go 0.1". MIXIM with z of 100 m (formation flights) can go 0.01"resolution, comparable to ALMA. MIXIM can be a realistic approach to obtain high spatial resolution X-ray images of bright almost-point-like sources, such as nearby AGNs, alternative to ultra high precision and expensive X-ray mirrors developed by authors.

Affiliation

Osaka University

Topic

Future missions

Primary authors: Prof. HAYASHIDA, Kiyoshi (Osaka University); Mr HANASAKA, Takashi (Osaka University); ASAKURA, Kazunori (Osaka University); YONEYAMA, Tomokage (Osaka University); NODA, Hirofumi (Osaka University); Mr OKAZAKI, Koki (Osaka University); Mr IDE, Shuntaro (Osaka University); Ms ISHIKURA, Ayami (Osaka University); Mr HATTORI, Kengo (Osaka University); Prof. MATSUMOTO, Hironori (Osaka University); Dr NAKAJIMA, Hiroshi (Kanto Gakuin University); Prof. AWAKI, Hisamitsu (Ehime University); Prof. TSUNEMI, Hiroshi (Osaka University)

Presenter: Prof. HAYASHIDA, Kiyoshi (Osaka University)

Session Classification: FUTURE MISSIONS

Contribution ID: **151** Type: **Poster**

What is the metal content of the Intra-Cluster Medium?

We make use of the XCOP sample to address two fundamental and unanswered questions: 1)What is the metal content of the Intra-Cluster Medium? 2) Is the metal content of the ICM consistent with that expected from the stellar population? We do this with XCOP, a very large program (VLP) on XMM-Newton designed to characterize a sample of 12 Massive Clusters out to large radii.

Affiliation

IASF-Milano/INAF

Topic

Hot and diffuse baryons

Primary author: GHIZZARDI, Simona (Istituto Nazionale di Astrofisica (INAF))

Co-authors: DE GRANDI, Sabrina (Istituto Nazionale di Astrofisica (INAF)); MOLENDI, Silvano; GASTALDELLO, Fabio; ROSSETTI, Mariachiara; ECKERT, Dominique

Presenter: GHIZZARDI, Simona (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **152** Type: **Poster**

A Neutron Star Ultra-Compact X-ray Binary Candidate

Friday, September 13, 2019 3:00 PM (2 minutes)

We report the discovery of a previously unnoticed X-ray source with a periodic variability at 614.28s. Its spectrum is an absorbed 1.8keV-blackbody with an iron-line feature. It has a Lx about $1.2 \times 10^{34} \times (\mathrm{D}/10\ \mathrm{kpc})^2$ erg s^{-1} and has no obvious optical counterpart(fx/fo larger than 1600). We argue it is most likely a neutron-star ultra-compact X-ray binary with the shortest orbital period so far.

Affiliation

NAOC

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Dr HABERL, Frank (MPE-MPG); SORIA, Roberto (UCAS)

Presenter: Dr HABERL, Frank (MPE-MPG)

Session Classification: POSTER SESSION

Contribution ID: **153** Type: **Poster**

NICER+NuSTAR phase-resolved spectroscopy of quasi-periodic oscillations in the X-ray binary GRS 1915+105

Friday, September 13, 2019 2:18 PM (2 minutes)

Low frequency quasi-periodic oscillations (QPO) with periods between ~10 s and ~0.05 s are often seen in the X-ray flux of accreting stellar-mass black holes. These are often attributed to the Lense-Thirring precession of the inner accretion flow, a General Relativistic effect caused by the spin of the black hole.
QPO phase-resolved spectroscopy, i.e. measuring how the X-ray spectrum changes with QPO phase, provides the best test of this model against alternative interpretations, since precession will lead to a rocking of the ~6.4 keV iron fluorescence line between Doppler red and blue shift over the course of each QPO cycle. We present a QPO phase-resolved spectral analysis of the bright black hole X-ray binary system GRS 1915+105 utilising simultaneous data from NICER and NuSTAR, using a novel method to track changes in the QPO centroid frequency during the course of the observation. The very high count rate and very broad band X-ray coverage (~0.3-79 keV) provided by the combination of NICER and NuSTAR makes this an ideal dataset for our analysis.

Affiliation

University of Oxford

Topic

Multi-messenger and transient astronomy

Primary authors: NATHAN, Edward (University of Oxford); INGRAM, Adam (University of Oxford)

Presenter: NATHAN, Edward (University of Oxford)

Session Classification: POSTER SESSION

Contribution ID: **155** Type: **Contributed**

First measurement of coronal properties in two luminous, high-z QSOs

Wednesday, September 11, 2019 10:40 AM (15 minutes)

X-ray emission from AGN is believed to be produced via Comptonization of optical/UV seed photons emitted by the accretion disk, up-scattered by hot electrons in a corona surrounding the black hole. A critical compactness vs. temperature threshold is predicted above which any increase in the source luminosity would generate positron-electron pairs rather than continue heating the coronal plasma.
Current observations seem to confirm that all AGN populate the region below this critical line. Pair production models, however, have never been probed by observations in the high-luminosity regime, where the critical line is expected to reach low temperatures.
To fill this observational gap, we selected two luminous (log(LBol)>47.5 erg/s) quasars, 2MASSJ1614 (z=1.86) and B1422 (z=3.62), and obtained XMM and NuSTAR deep observations. We performed detailed spectral analysis of their quasi-simultaneous soft and hard X-ray data, in order to constrain the parameters of their coronae.
Using a phenomenological cut-off power-law model plus reflection, we derived rest-frame values of the high energy cut-off of Ecut=106+102-37 keV and Ecut=66+17-12 keV, respectively. Comptonization models consistently give as best-fit parameters electron temperatures of ~45 keV and ~28 keV, and optically thick coronae (τ >1). These low coronal temperatures fall in the limited region allowed at these luminosities to avoid runaway pair production.

Affiliation

INAF-OAS

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr LANZUISI, Giorgio (INAF-OAS)

Co-authors: BIANCHI, Stefano (Università degli Studi Roma Tre); Prof. BRANDT, Niel (Penn State University); BRUSA, Marcella (Istituto Nazionale di Astrofisica (INAF)); CAPPI, Massimo (Istituto Nazionale di Astrofisica (INAF)); Prof. CHARTAS, George (Department of Physics and Astronomy, College of Charleston); Dr CIVANO, Francesca (Harvard-Smithsonian centre for Astrophysics); COMASTRI, Andrea (Istituto Nazionale di Astrofisica (INAF)); DADINA, Mauro (Istituto Nazionale di Astrofisica (INAF)); GASPARI, Massimo (Princeton University); GILLI, Roberto (Istituto Nazionale di Astrofisica (INAF)); MARINUCCI, Andrea (Università Roma Tre); MIDDEI, Riccardo (Università degli Studi Roma Tre); PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF)); TOMBESI, Francesco (University of Rome "Tor Vergata"); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna)

Presenter: Dr LANZUISI, Giorgio (INAF-OAS)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **156** Type: **Contributed**

Astrometry of Black Hole X-ray Binaries with Gaia DR2: Implications for their formation and evolution

Monday, September 9, 2019 12:45 PM (15 minutes)

Fundamental properties of black hole X-ray binaries (BHXBs) are important in massive stellar evolution and high energy astrophysics. But, their astrometric properties have been reported for a handful of objects, because their transient behavior, faint optical counterparts and large distances (> 1 kpc) have made comprehensive astrometric investigations of BHXBs very challenging. Gaia has dramatically changed this situation. We present distance and peculiar motion results for 11 BHXBs using Gaia DR2, with peculiar velocities for 7 of them being reported for the first time. Distances estimated using Bayesian methods are found to be in agreement with those reported in the literature which all used photometric and spectroscopic methods, with the only exception being BW Cir. We further emphasize Gaia's potential in measuring distances of newly discovered transients with two recent examples: MAXI J1820+070 and MAXI J1727-203. Our results on the observed weak anti-correlation between the kinetic energy of peculiar motion and BH mass suggests a BH formation scenario where the natal kick imparted to the black hole during core collapse scales with its mass. We will discuss the formation of BHXBs, particularly focusing on short orbital period systems, based on our investigation of their z-heights from the Galactic plane and their orbital period distribution. We further utilized Gaia data of Cyg X-1 and neighboring stars in the region of Cyg OB3. The consistent values of distance, proper motion, peculiar and relative velocity of Cyg X-1 and those of the other stars in the region suggests that Cyg OB3 can be identified as the parent stellar association of Cyg X-1. With the present and forthcoming data releases, Gaia has emerged as a powerful aide in probing the properties of BHXBs.

Affiliation

University of Southampton

Topic

Multi-messenger and transient astronomy

Primary authors: Dr RAO, Anjali (University of Southampton); Dr GANDHI, Poshak (University of Southampton); Mr PAICE, John A (University of Southampton); Dr KNIGGE, Christian (University of Southampton); Prof. CHARLES, Phil A (University of Southampton); Mr JOHNSON, Michael A.C. (University of Southampton); Prof. MACCARONE, Thomas J. (Texas Tech University)

Presenter: Dr RAO, Anjali (University of Southampton)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **157** Type: **Contributed**

Size of the ISCO and hot corona from gravitational lensing

Wednesday, September 11, 2019 2:30 PM (15 minutes)

We present current X-ray observations and simulations showing how gravitational lensing is used to infer the structure near the event horizons of black holes, constrain the spin of the supermassive black hole and its evolution over cosmic time and test general relativity in the strong-gravity regime.
We also show how these observations can be expanded to a statistically large sample of z = 0.5-5 lensed quasars with the predicted discovery by LSST of > 4,000 additional gravitationally lensed systems and with a next generation X-ray telescope having a spatial resolution of <0.5arcsec to resolve the lensed images and a collecting area of > 0.5 m^2 at 1 keV.

Affiliation

College of Charleston

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr CHARTAS, George (College of Charleston)

Presenter: Dr CHARTAS, George (College of Charleston)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **159** Type: **Poster**

The X-ray/UV luminosities relation in high-redshift quasars

Friday, September 13, 2019 6:40 PM (2 minutes)

A tight non-linear relation between the X-ray and optical-ultraviolet emission has been observed in unobscured Active Galactic Nuclei (AGN) over several orders of magnitude in luminosity and irrespective of the sample selection, suggesting a universal coupling between the disk, emitting the primary radiation in the UV band, and the hot corona emitting in the X-ray.
Recently, our group developed a method to use the non-linearity of the relation to estimate the absolute luminosity of quasars, turning them into standardizable candles.
In this regard, we investigated the presence of potential systematics of this correlation at high redshift; studying the $L_{\rm X} - L_{\rm UV}$ relation for a sample of 55 $z > 4$ quasars, selected on the basis of their spectral properties and the quality of the available observations in both X-ray and optical/UV bands.
We found that the relation shows no-evidence for evolution with redshift, implying that the physical mechanism regulating the energy transfer between the accretion disc and the X-ray emitting corona has to be ubiquitous, hence allowing the use of quasars in observational cosmology.

Affiliation

DiFA - UNIVERSITA' DI BOLOGNA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: SALVESTRINI, Francesco (Istituto Nazionale di Astrofisica (INAF)); RISALITI, Guido (Istituto Nazionale di Astrofisica (INAF))

Co-authors: BISOGNI, Susanna (INAF Osservatorio Astrofisico di Arcetri); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); LUSSO, Elisabeta

Presenter: SALVESTRINI, Francesco (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **160** Type: **Contributed**

Tension with the LCDM model from a Hubble diagram of quasars.

Thursday, September 12, 2019 9:30 AM (15 minutes)

The cosmological concordance model (ΛCDM) well accounts for a wealth of observations, from the existence of Cosmic Microwave background (CMB) to the discovery of the accelerated expansion of the universe from Type Ia supernovae. Yet, it assumes a still unknown form of dark energy and matter and some tensions arose recently as, for instance, the discovery of a >3σ discrepancy between the local (Riess et al. 2016) and Planck (Aghanim et al. 2016) measurement of H0. In addition, the ΛCDM model is poorly tested in the redshift interval between the farthest observed Type Ia supernovae (z~1.4) and that of the CMB (z~1100). We present new measurements of the expansion rate of the Universe in the redshift range z=0.5-5.5 based on a Hubble diagram of quasars. The distance of quasars have been estimated from the observed non-linear relation between the X-ray and ultraviolet emission, following a method developed by our group. The distance-redshift relation of quasars at z<1.4 is in agreement with that of supernovae and with the concordance model. Nonetheless, a deviation from the ΛCDM model emerges at higher redshift, with a statistical significance of ~4σ. We found that, if an evolution of the dark energy equation of state is allowed, our data suggest a dark energy density increasing with time.

Affiliation

Dipartimento di Fisica e Astronomia, Università di Firenze

Topic

Primary author: LUSSO, Elisabeta (Dipartimento di Fisica e Astronomia, Università di Firenze)

Presenter: LUSSO, Elisabeta (Dipartimento di Fisica e Astronomia, Università di Firenze)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **161** Type: **Poster**

Exponential Temporal Decay of Extended Emissions in Short Gamma-Ray Bursts with Possible Luminosity – E-folding Time Correlation

Friday, September 13, 2019 2:10 PM (2 minutes)

The origin of extended emissions following prompt emissions of short gamma-ray bursts (SGRBs) is in mystery. The long-term activity of the extended emission is responsible for promising electromagnetic counterparts to gravitational waves and, so that it may be a key to uncovering the progenitor of SGRBs. We investigate the early X-ray light curves of 26 SGRBs with known redshifts observed with the X-Ray Telescope aboard the {\it Neil Gehrels Swift Observatory} ({\it Swift}). We find that the exponential temporal decay model is able to describe the extended emissions comprehensively with a rest-frame e-folding time of 20 − 200 seconds. We also estimate the isotropic equivalent energies of the extended emission with the exponential decay model and of the prompt emission, compared with those of the prompt emission. Then, it is revealed that the extended emission is 0 − 3 orders of magnitude less powerful than the prompt emission. Finally, we find a strong correlation between the expected maximum luminosity and e-folding time which can be described by a power-law with an index of -3.3 and whose chance probability of 8.2×10^{-6} if there is no observation bias of {\it Swift}. In this presentation, we discuss the detail of the analysis and the physical model of the exponentially decaying extended emission.

Affiliation

Kanazawa University

Topic

Multi-messenger and transient astronomy

Primary author: KAGAWA, Yasuaki (Kanazawa University)

Co-authors: Prof. YONETOKU, Daisuke (Kanazawa University); Prof. ARIMOTO, Makoto (Kanazawa University); Dr SAWANO, Tatsuya (Kanazawa University); Prof. YAMAZAKI, Ryo (Aoyama Gakuin University); Dr KISAKA, Syota (Tohoku University)

Presenter: KAGAWA, Yasuaki (Kanazawa University)

Session Classification: POSTER SESSION

Contribution ID: **165** Type: **Contributed**

X-raying the Planck legacy: X-ray properties of SZ-selected galaxy clusters

Tuesday, September 10, 2019 2:50 PM (15 minutes)

The Sunyaev-Zeldovich effect provides an observational window to the intracluster medium, which is complementary to X-ray observations, and over the last few years has proved to be a mature technique to efficiently detect galaxy clusters. For instance, the Planck survey has mapped the whole microwave sky, detecting almost 2000 candidate massive clusters up to z~1, performing the first all-sky survey of galaxy clusters 20 years after the RASS. However, X-ray data are still essential to measure in details the properties of the ICM.
I will present preliminary results on the population of massive and high-redshift clusters in the PSZ2 catalogue that we followed-up with Chandra. These observations have allowed us to identify interesting extreme merging systems, candidate cool cores and to study the evolution of the density profiles with respect to Planck-selected samples at lower z and mass.
I will also introduce a population of candidate X-ray underluminous clusters discovered in the Planck catalogue. The analysis of follow-up XMM-Newton observations has allowed us to measure their main ICM properties and to assess that they lie at the boundary of the scatter of known scaling relations.

Affiliation

IASF-Milano INAF

Topic

Hot and diffuse baryons

Primary author: ROSSETTI, Mariachiara (Istituto Nazionale di Astrofisica (INAF))

Presenter: ROSSETTI, Mariachiara (Istituto Nazionale di Astrofisica (INAF))

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **166** Type: **Poster**

Hunting for X-ray Quasi-Periodic Eruptions: discovery of a second QPE active galactic nucleus

Friday, September 13, 2019 5:36 PM (2 minutes)

Quasi-Periodic Eruptions have been recently discovered in the nucleus of the low-mass black hole galaxy GSN 069. QPEs are abrupt increases in the X-ray count rate over a quiescent flux level, and recur quasi-periodically every few hours (Miniutti et al. 2019, Nature in press). Thanks to a new XMM-Newton observation performed at the end of May 2019, we have discovered X-ray QPEs in a second active galactic nucleus, RX J1301.9+2747. We present the general temporal and spectral properties of the X-ray QPEs, together with some possible interpretations for this new physical phenomenon. QPEs could be key to understand puzzling aspects of the physics of accretion around super massive black holes, such as the fast variability displayed by the changing-look AGN, or the formation of the soft X-ray excess.

Affiliation

CAB - Centro de Astrobiología (CSIC-INTA)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: GIUSTINI, Margherita (Centro de Astrobiología (CSIC-INTA)); MINIUTTI, Giovanni; Dr SAXTON, Richard (XMM-Newton SOC, ESAC)

Presenter: GIUSTINI, Margherita (Centro de Astrobiología (CSIC-INTA))

Session Classification: POSTER SESSION

Contribution ID: **167** Type: **Contributed**

The HERMES Project: Probing Space-time Quantum Foam and Hunting for Gravitational Wave Electromagnetic Counterpart”

Thursday, September 12, 2019 5:35 PM (15 minutes)

I discuss how several of the proposed models for space-time quantization predict an energy dependent speed for photons.
Although the predicted discrepancies with the general speed of light are minuscule, I discuss how it is possible to detect this intriguing signature of space-time granularity with a new concept of modular observatory for photons in the energy band from few keV to few MeV. This observatory may consist of a swarm of micro/nano-satellites on low orbits. Sub-microsecond time resolution and wide energy band allows to probe tiny energy dependent delays, expected to be the signature of the granular structure of space-time in several of the proposed theories of Quantum Gravity. Moreover this kind of experiment allows to perform temporal triangulation of high signal to noise impulsive events with positional accuracies of few arcseconds, making an observatory like that a promising hunter for the elusive electromagnetic counterparts of Gravitational Waves.

Affiliation

University of Cagliari

Topic

Future missions

Primary author: BURDERI, Luciano (University of Cagliari)

Co-authors: Dr SANNA, Andrea (University of Cagliari); Prof. DI SALVO, Tiziana (University of Palermo); Prof. RIGGIO, Alessandro (University of Cagliari); Prof. IARIA, Rosario (University of Palermo); Dr FIORE, Fabrizio (INAF)

Presenter: BURDERI, Luciano (University of Cagliari)

Session Classification: FUTURE MISSIONS

Contribution ID: **168** Type: **Contributed**

A Chandra and ALMA Study of X-ray-irradiated Gas in the Central ~100 pc of the Circinus Galaxy

Thursday, September 12, 2019 11:55 AM (15 minutes)

The AGN effect on host galaxies is an interesting topic that has been often discussed so far. The AGN is usually X-ray luminous, and thus X-ray irradiation by the AGN is unavoidable for its host galaxy. We report our recent study on X-ray-irradiated gas in the central ~100 pc of the Circinus galaxy (TK+19), a Compton-thick AGN host, at 10-pc resolution using Chandra and ALMA. Based on ~200 ksec Chandra/ACIS-S data, we created an image of the Fe Kalpha line at 6.4 keV, tracing X-ray-irradiated dense gas. The ALMA data in Bands 6 (~270 GHz) and 7 (~350 GHz) cover five molecular lines: CO(3−2), HCN(3−2), HCN(4−3), HCO^+(3−2), and HCO^+(4−3). The detailed spatial distribution of dense molecular gas was revealed, and compared to the iron line image. The molecular gas emission appeared faint in regions with bright iron emission. Motivated by this, we quantitatively discuss the possibility that the molecular gas is efficiently dissociated by AGN X-ray irradiation (i.e., creating an X-ray-dominated region). Based on a non-local thermodynamic equilibrium model, we constrained the molecular gas densities and determined that they are as low as interpreted by X-ray dissociation. Furthermore, judging from inactive star formation (SF) reported in the literature, we suggest that the X-ray emission has potential to suppress SF, particularly in the proximity of the AGN.

Affiliation

NAOJ

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: KAWAMURO, Taiki

Presenter: KAWAMURO, Taiki

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **169** Type: **Poster**

The unusual suspects. A new population of X-ray weak quasars at high redshift.

Friday, September 13, 2019 6:20 PM (2 minutes)

We have recently obtained deep XMM-Newton observations of 30 bright quasars, selected in the optical from the SDSS-DR7 to be representative of the most luminous, intrinsically blue quasars at high redshift ($3.0 < z < 3.3$). Despite the uniform selection in terms of optical/UV spectral properties and the narrow range of luminosity, black-hole mass and accretion rate probed by our sample, two distinct populations surprisingly emerge from the X-ray analysis: about two thirds of the targets perfectly follow the well-established, non-linear UV vs. X-ray luminosity relation, while the remaining one third lie significantly below the expectations. The X-ray spectra of the latter sources are flatter and show no evidence of absorption, suggesting a different disc/coronal state. As our sample picks the kind of objects where radiative feedback is supposed to be most intense, we argue that intrinsically X-ray weak quasars (i.e. emitting much less in the X-rays than dictated by the X/UV relation) are currently undergoing a blow-out phase, during which a substantial fraction of the gravitational energy is dissipated to drive a powerful accretion-disc wind, thus starving the corona. This result provides novel insights into the nature and incidence of X-ray weakness in quasars, and its physical link to the most critical phases of galaxy evolution.

Affiliation

INAF - Arcetri

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: NARDINI, Emanuele (Istituto Nazionale di Astrofisica (INAF))

Presenter: NARDINI, Emanuele (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **170** Type: **Contributed**

X-raying stellar winds in high mass X-ray binaries

Tuesday, September 10, 2019 9:45 AM (15 minutes)

In high mass X-ray binaries (HMXBs), the black hole or neutron star accretes matter from the wind of a massive supergiant companion: the stellar wind drives changes in the accretion and thus the system's X-ray emission. But the interaction of this emission with the wind material can also be used to study the wind itself, in particular its geometry, porosity (or clumpiness), mass-loss rate and interaction with the compact object. HMXBs are our unique chance to probe individual clumps as opposed to the wind as a whole. They are, at the same time, among the best tools to study accretion processes, often using the same observation.
Our recent and ongoing high resolution studies of two of the brightest HMXBs, have opened a new window onto the wind structure. In Cygnus X-1, absorption-strength resolved spectroscopy reveals the onion-like structure of the wind clumps, with a highly ionized exterior and a colder, less ionized interior. In Vela X-1, our analysis implies a co-existence of cold and hot gas in a highly variable, structured accretion flow close to the neutron star, similar to what is seen in recent simulation of clumpy wind accretion in HMXBs. An observation during a flare in this source further allows us to probe the reaction of the wind structure to changes in X-ray irradiation.
But we are currently limited by both resolution and sensitivity of today's instruments. Only XRISM and Athena will enable us to observe individual wind clumps in bright sources such as Cyg X-1 And Vela X-1 and thus constrain clump origin in wind or structured accretion flow. First high quality high resolution observations of fainter sources will finally provide us with a sample of HMXBs that will allow to compare wind properties in massive stars of different stellar (sub-)types and, based on the different distances of compact object and donor star, at different radii, constraining theories of clumpy wind formation and evolution.

Affiliation

IAAT Tübingen

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: GRINBERG, Victoria (IAAT / University Tübingen); Dr HELL, Natalie (LLNL); HIRSCH, Maria (Remeis/ECAP, FAU); Dr EL MELLAH, Ileyk (KU Leuven); Dr KRETSCHMAR, Peter (ESA); LOMAEVA, Maria (ESA/ESTEC); Prof. WILMS, Joern (Remeis Observatory / ECAP); NOWAK, Michael (Washington University in St. Louis); Dr POTTSCHMIDT, Katja (NASA-GSFC / UMBC / CRESST); Dr LEUTENEGGER, Maurice (NASA/GSFC)

Presenter: GRINBERG, Victoria (IAAT / University Tübingen)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **171** Type: **Poster**

Probing the building blocks of galaxies: sub-galactic scaling relations between X-ray luminosity, SFR and stellar mass

Friday, September 13, 2019 3:10 PM (1 minute)

X-ray emission from star-forming galaxies is a new frontier for probing recent star-formation. X-ray emission, SFR, and stellar mass scaling relations are a unique probe of the connection between X-ray binaries and stellar populations. While most scaling relations are based on studies of the integrated emission of galaxies, very little is known about their validity and scatter in sub-galactic scales. We explored this connection using a sample representative of the star-formation activity in the local Universe (Star-Formation Reference Survey; SFRS) along with a comprehensive set of star-formation (radio, FIR, 24μm, 8 μm, Hα, UV, SED fitting) and stellar mass (K-band, 3.6 μm, SED fitting) indicators, and X-ray observations. We investigated the X-ray luminosity –SFR and X-ray luminosity –stellar mass scaling relations down to sub-galactic scales of ~1 kpc^2. This way we extend these relations to extremely low SFR (~10^-6 Msol/yr) and stellar mass (~10^6 Msol), reaching the regime of dwarf galaxies. We also quantified their scatter and their dependence on the age of the local stellar populations as inferred from the different age sensitive SFR indicators, and we compare them with predictions from X-ray binary population synthesis models. These results are particularly important for setting the benchmark for the formation of X-ray binaries in vigorous, but low SFR objects such as the numerous dwarf galaxies and galaxies in the early Universe, and for including the X-ray band in panchromatic SED fitting models.

Affiliation

University of Crete/ F.O.R.T.H.

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: KOUROUMPATZAKIS, Konstantinos (University of Crete / F.O.R.T.H.); ZEZAS, Andreas (University of Crete); Dr SELL, Paul (University of Crete); KOVLAKAS, Konstantinos (University of Crete); Dr BONFINI, Paolo (University of Crete); Dr MATHEW, Ashby (Center for Astrophysics); Dr WILNER, Steven (Center for Astrophysicsc)

Presenter: KOUROUMPATZAKIS, Konstantinos (University of Crete / F.O.R.T.H.)

Session Classification: POSTER SESSION

Contribution ID: **172** Type: **Contributed**

The FORCE mission: a future Japan-lead mission for broadband X-ray imaging spectroscopy with high-angular resolution

Thursday, September 12, 2019 5:50 PM (15 minutes)

We present the concept of a future Japan-lead X-ray medium-class mission, FORCE (Focusing On Relativistic universe and Cosmic Evolution). FORCE is characterized by broadband (1-80 keV) X-ray imaging spectroscopy with high angular resolution (<15”). The sensitivity above 10 keV will be 10 times higher than that of any previous hard X-ray missions. FORCE will trace the cosmic formation history by searching for ‘’missing black holes” like buried supermassive black holes and orphan stellar-mass black holes. Investigation of the nature of relativistic particles at various astrophysical shocks is also in our scope. The current designs of the satellite and detectors and the future prospects of the mission are also presented.

Affiliation

Univesity of Miyazaki

Topic

Future missions

Primary author: Dr MORI, Koji (University of Miyazaki)

Co-authors: Prof. TSURU, Takeshi (Kyoto University); Dr NAKAZAWA, Kazuhiro (Nagoya University); Prof. UEDA, Yoshihiro (Kyoto University); Dr OKAJIMA, Takashi (NASA/GSFC); Dr MURAKAMI, Hiroshi (Tohoku Gakuin University); Prof. AWAKI, Hisamitsu (Ehime University); Prof. MATSUMOTO, Hironori (Osaka University); Prof. FUKAZAWA, Yasushi (Hiroshima University); Prof. TSUNEMI, Hiroshi (Osaka University); Prof. ISHIDA, Manabu (ISAS/JAXA); Prof. TAKAHASHI, Tadayuki (Univesity of Tokyo/Kavli IPMU); Prof. ZHANG, William (NASA/GSFC)

Presenter: Dr MORI, Koji (University of Miyazaki)

Session Classification: FUTURE MISSIONS

Contribution ID: **173** Type: **Poster**

Exploiting the Chandra Source Catalog 2.0: the first science results

Friday, September 13, 2019 5:06 PM (2 minutes)

The Chandra Source Catalog 2.0 is a powerful tool providing properties for 315,000 X-ray sources detected in the observations taken prior of 2015. We cross-matched the Sloan Digital Sky Survey DR14 and the CSC2.0 to build a sample of >6500 optically selected quasars that have both optical and X-ray spectroscopic information. This sample can be considered as a gold mine for studies on the quasar population. As a first application, we used it to analyze the relation between the X-ray and Ultraviolet luminosities in quasars and its non-evolution with redshift. Recently, it was found that the dispersion of this relation is not intrinsic, but mostly due to observational issues in measuring the two fluxes (at 2kev and 2500Å rest-frame). The results published so far with archival samples made use of only photometric data, reaching a dispersion of 0.24 dex on the relation. Here we present a huge step forward by using spectra provided by the newly released catalog, which allow us to obtain an unprecedentedly small dispersion of sigma<0.20 dex.

Affiliation

Università degli Studi di Firenze, INAF-OAA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: BISOGNI, Susanna (INAF Osservatorio Astrofisico di Arcetri)

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Presenter: BISOGNI, Susanna (INAF Osservatorio Astrofisico di Arcetri)

Session Classification: POSTER SESSION

Contribution ID: **174** Type: **Contributed**

The realm of hyperluminous quasars

Thursday, September 12, 2019 10:00 AM (15 minutes)

We are performing a systematic study of the the X-ray properties of the most luminous ($L_{bol} > 10^{47}$ erg/s) quasars in the Universe spanning from optical- NIR- MIR-selected sources at z=2-3. These AGN exhibit widespread outflow signatures at all scales and they are the sources where we expect quasar feedback to manifests in full force. Hence they are in a transit phase, predicted in quasar merger-driven evolutionary scenarios, where powerful winds sweep out the obscuring-dust and leads to optically bright quasars. Our study aim at investigating the link between nuclear energetic output and the acceleration of winds. We find a mixture of unobscured and obscured sources with column density values reaching ~10^24 cm-2. Given the high Eddington ratio this is indicative that the nuclear regions in most of these systems are in the blow-out phase. Furthermore we discover that, despite the similarly high bolometric luminosity, the coronal X-ray radiative output varies by 1.5 dex and anti-correlate with the broad line region wind velocity. This evidence points to a link between the presence of winds and the nuclear radiative output.

Affiliation

INAF - OAR

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: ZAPPACOSTA, Luca (Istituto Nazionale di Astrofisica (INAF))

Co-author: PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF))

Presenter: ZAPPACOSTA, Luca (Istituto Nazionale di Astrofisica (INAF))

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **175** Type: **Poster**

Distribution of Matter in and around Galaxies

Friday, September 13, 2019 4:02 PM (2 minutes)

The chemical evolution of the Universe embraces aspects that reach deep into modern astrophysics and cosmology. We want to know how present and past matter is affected by various levels and types of nucleo-synthesis and stellar evolution. Three major categories include the study of pre-mordial star and black hole formation, the embedded evolution of the intergalactic medium (IGM), and the status and evolution of stars and the interstellar medium (ISM) in galaxies. A fourth category relates to our understanding of dark matter in relation with these three categories. The X-ray band is particularly sensitive to K- and L-shell absorption and scattering from high abundant elements like C, N, O, Ne, Mg, Si, S, Ar, Ca, Fe, and Ni. Like the Lyman alpha forest in the optical band, absorbers in the IGM produce an X-ray line forest along the line of sight in the X-ray spectrum of a background quasar. Similary bright X-ray sources within galaxies and the Milky Way produce a continuum, which is being absorbed by elements in various phases of the ISM.

Since its emergence, high resolution X-ray spectroscopy has greatly impacted studies of properties of the gas phases of the ISM of the Milky Way. greatly impacted studies of properties of the gas phases in the interstellar medium (ISM) of the Milky Way and warm absorber phases in galaxies. At the forefront we have the high energy transition grating spectrometer (HETGS) with its unprecedented spectral resolution onboard the Chandra X-Ray Observatory. Resolving the O K, Ne K, and to some extent the Fe L edge structures reveal how X-ray spectra are are affected by absorption and exposed the physics of the cold, warm, ionized and hot phases of the ISM. Studies of higher Z edges such as Mg K, Si K, S K and to a large extent Fe L in contrast indicate dominant dust signatures in the edge structure. In this presentation we review and summarize the efforts made by observations with the HETGS so far and include recent findings of multiple edge functions, near edge absorption excesses from silicates in dust form, contributions from X-ray scattering optical depths as well a the presence of variable warm absorbers from silicon and iron. These studies also reveal that many of the details we observe remain unchallenged by current capabilites. In this respect we also show how future observatories such as Athena, XARM, and possibly Arcus and Lynx will lead us to a much broader understanding of the categories defining the state and distribution of matter in and around galaxies.

Affiliation

Massachusetts Institute of Technology

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr SCHULZ, Norbert S. (Massachusetts Institute of Technology)

Presenter: Dr SCHULZ, Norbert S. (Massachusetts Institute of Technology)

Session Classification: POSTER SESSION

Contribution ID: **176** Type: **Poster**

The Athena Community Office

Friday, September 13, 2019 8:28 PM (2 minutes)

The *Athena* Community Office (ACO) was established by ESA's *Athena* Science Study Team (ASST) in order to obtain support in performing its tasks assigned by ESA, and most especially in the ASST role as "focal point for the interests of the broad scientific community". The ACO is led by the Instituto de Física de Cantabria (CSIC-UC). Further ACO contributors are the University of Geneva, MPE and IRAP.

In this poster, we will describe the ACO main responsibilities, which are: assist the ASST in organising and collecting support from the *Athena* Working Groups and Topical Panels; organise and maintain the documentation generated by the Athena Working Groups and Topical Panels; manage the Working Group and Topical Panel membership lists; assist the ASST in promoting *Athena* science capabilities in the research world, through conferences and workshops; keep a record of all papers and presentations related to *Athena*; support the production of ASST documents; produce and distribute regularly an *Athena* Newsletter, informing the community about all mission and science developments; maintain the Athena Community web portal; maintain an active communication activity; promote, organise and support *Athena* science-related public outreach, in coordination with ESA and other agencies involved when appropriate; and, design, produce materials and provide pointers to available materials produced by other parties.

In summary, ACO is meant to become a focal point to facilitate the scientific exchange between the *Athena* activities and the scientific community at large, and to disseminate the *Athena* science objectives to the general public.

Affiliation

Instituto de Física de Cantabria (CSIC-UC)

Topic

Future missions

Primary authors: MARTÍNEZ-NÚÑEZ, Silvia (Instituto de Física de Cantabria (CSIC-UC)); Prof. CARRERA, Francisco J. (Instituto de Física de Cantabria (CSIC-UC)); Dr CEBALLOS, María Teresa (Instituto de Física de Cantabria (CSIC-UC)); Dr MONTERDE, Pilar (Instituto de Física de Cantabria (CSIC-UC)); Dr BARRET, Didier (IRAP); Dr BOZZO, Enrico (Geneva University); Dr RAU, Arne (MPE)

Presenter: MARTÍNEZ-NÚÑEZ, Silvia (Instituto de Física de Cantabria (CSIC-UC))

Session Classification: POSTER SESSION

Contribution ID: **177** Type: **Poster**

Accretion in Ultracompact X-ray Binaries: A Unified Picture of 4U 1626-67

Friday, September 13, 2019 3:19 PM (2 minutes)

Ultracompact X-ray binaries (UCXBs) are binaries with a neutron star accretor and an orbital period less than 80 minutes. Here, I focus on our comprehensive review of *Chandra* observations of the unique UCXB 4U 1626-67, the only known UCXB to host a strongly-magnetized accreting pulsar. Our sophisticated modeling of the X-ray gratings spectra finds intriguing results: we observe strong, double-peaked emission lines of neon and oxygen, consistent with an accretion disk made up of a collisionally-ionized, two-temperature, pure Ne/O plasma. This is an unexpected result in several respects: the X-ray pulsar was expected to produce a photoionized plasma, not collisional; the two-temperature structure is difficult to reconcile with the measured distance scales of the accretion disk; and the composition of the donor is out of line with any standard white dwarf model. However, we believe we have come up with a coherent picture of this source that reconciles most of these conflicts, which I will present.

Affiliation

MIT

Topic

Primary author: HEMPHILL, Paul (Massachusetts Institute of Technology)

Co-authors: Prof. CHAKRABARTY, Deepto (MIT); Dr MARSHALL, Herman (MIT); SCHULZ, Norbert S. (MIT)

Presenter: HEMPHILL, Paul (Massachusetts Institute of Technology)

Session Classification: POSTER SESSION

Contribution ID: **178** Type: **Poster**

Restarting activity in hard X-ray selected giant radio galaxies

Friday, September 13, 2019 6:56 PM (2 minutes)

Giant radio galaxies (GRGs) are the largest (size >0.7 Mpc) and most energetic single objects in the Universe and represent an extreme class among radio-loud/jetted active galactic nuclei. Such large and old sources are ideal targets to study the duty cycle of the jet and nuclear activity. Here we discuss the X-ray and radio properties of a complete subsample of 15 GRGs; the sources were extracted from a parent sample of ~70 radio galaxies selected, for the first time, in the hard X-ray band from the INTEGRAL and Swift/BAT catalogues (Bassani et al. 2016). We find a correlation between the X-ray luminosity and the radio core luminosity consistent with the so-called fundamental plane of black hole activity, while the radio luminosity of the radio lobes is a factor of 10 weaker than expected from the nuclear luminosity (Ursini et al. 2018). We also find that, despite their old age, a large (~60%) fraction of objects host a young, gigahertz-peaked spectrum radio core (Bruni et al. 2019). Moreover, several objects show a peculiar radio morphology, such as double-double or X-shaped, indicative of a restarted activity. All in all, the X-ray and radio properties suggest an evolution driven by multiple activity phases of the central engine. Finally, we discuss the hard X-ray GRGs as multi-messenger sources of cosmic rays, gamma rays and neutrinos.

Affiliation

INAF-OAS Bologna

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: URSINI, Francesco (Istituto Nazionale di Astrofisica (INAF)); Dr BASSANI, Loredana (INAF-OAS Bologna); BRUNI, Gabriele (Istituto Nazionale di Astrofisica (INAF)); PANESSA, Francesca (Istituto Nazionale di Astrofisica (INAF)); Prof. BIRD, Antony J. (Univ. Southampton); Dr BAZZANO, Angela (IASF, INAF, Rome); Dr MALIZIA, Angela (Istituto Nazionale di Astrofisica (INAF)); Prof. UBERTINI, Pietro (IASF, INAF, Rome)

Presenter: URSINI, Francesco (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **179** Type: **Poster**

Looking near the AGN with Chandra

Friday, September 13, 2019 5:26 PM (2 minutes)

We will present recent high resolution Chandra work on the inner few arc seconds regions of AGNs, including our recent work on ESO 428-G014 and NGC2110. Together with ALMA and optical data these results give us a new view of the multi-phase ISM, excited by the AGN

Affiliation

Center for Astrophysics | Harvard & Misthsonian

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr FABBIANO, Giuseppina (Center for Astrophysics | Harvard & Smithsonian)

Presenter: Dr FABBIANO, Giuseppina (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: POSTER SESSION

Contribution ID: **180** Type: **Poster**

AGN Fe-K reverberation lags explained by the outflow

Friday, September 13, 2019 5:20 PM (2 minutes)

Fe-K reverberation lags are commonly observed in Seyfert galaxies.
If the observed short lag timescale (~100 sec) is literally interpreted as the
light-travel time, an extremely compact X-ray emitting corona is hinted
to locate at very close to the black hole.
Alternatively, the apparently short Fe-K lag may be a natural consequence
of the much further reprocessing site where the light-travel
time is ~1000 sec, such that the Fe-K photon lags are
"diluted" by the direct photons which are not lagged and ~10 times more dominant
in number in the Fe-K energy band.

We carried out a precise Monte-Carlo simulation of the Fe-K reverberation lags expected
from AGN outflow. We assumed a realistic biconical geometry of the outflow which is highly
photo-ionized. As a result, we have succeeded to quantitatively explain the
short Fe-K reverberation lags observed from 1H0707-405 and Ark 564.
While these sources show very similar Fe-K lag features, the Fe-K spectral features are
very different; 1H0707-405 shows a strong P-Cygni profile while Ark 564 shows a much weaker
spectral signature.
These spectral differences are understood in the context of the outflow model, assuming
a large outflow solid-angle in the line-of-sight in the former case, and
a smaller outflow solid-angle out of the line-of-sight in the latter case.

The hot-inner outflow will eventually get fragmented into clumpy
clouds due to instability. Such outer
clumpy clouds cause partial covering of the central X-ray emitting region, and
change of the partial covering fraction is responsible for observed spectral variations.
Consequently, the "Hot-inner and Clumpy-outer Wind" model
simultaneously explains both the Fe-K reverberation lags and
spectral variations of Seyfert galaxies in 0.2-78 keV observed by XMM-NuSTAR,
in terms of only changes of the partial covering fractions and intrinsic luminosities.

Affiliation

ISAS/JAXA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Prof. EBISAWA, Ken (ISAS/JAXA)

Co-author: Dr MIZUMOTO, Misaki (Duhram University)

Presenter: Prof. EBISAWA, Ken (ISAS/JAXA)

Session Classification: POSTER SESSION

Contribution ID: **181** Type: **Poster**

The long outburst of the black hole transient GRS 1716-249

Friday, September 13, 2019 2:42 PM (2 minutes)

The spectral states of the Black Hole Binaries (BHBs) are characterised by different X/γ-ray luminosities, spectral shapes and timing properties over their outburst. The dominant hard X-ray component observed in the hard state spectrum is usually described by a cut-off power law and it is interpreted as thermal Comptonization.
We present the the spectral and timing analysis of X/γ-ray observations of the black hole transient GRS 1716-249 performed during the 2016-2017 outburst.
GRS 1716-249 increases the number of black hole transients showing outbursts with "failed" state transition. The XRT and BAT broad band spectra modeling with a thermal Comptonization plus a multi-color disk blackbody, showed spectral parameters characteristic of the HS-HIMS in agreement with the evolution of the root mean square amplitude of the flux variability. We find that, coherently with a scenario in which the disc moves closer to the compact object, the accretion disc could have reached the ISCO during the HIMS or the hot accretion flow might have re-condensated in an inner mini-disc.
The advent of γ-ray telescopes allowed to observe an additional high energy excess above 200 keV, during either hard (HS) or hard/intermediate states (HIMS). This component is usually explained as a Comptonization process due to a non-thermal electron populations in the corona, but there is not a unique theory to explain it, yet.
We observed that the X/γ-ray broad band spectrum of GRS 1716-249 showed a high energy excess in addition to the thermal Comptonization model adopted when using XRT and BAT data only.
The parameters obtained by the X/γ-ray broad band modeling, with the physical hybrid thermal/non-thermal model, are typical of hard state spectra. Moreover, we fitted our data with the magnetized hybrid Comptonization model BELM. This provided us with an upper limit on the magnetic field intensity of about 10^6 G.
Finally, we present our study with the aim to possibly explain the high energy excess observed during the hard state as due to jets. We computed a Spectral Energy Distribution with Swift, INTEGRAL, ATCA and REM observations during the hard spectral state of the source. We modeled the accretion flow with an irradiated disc plus Comptonization model and the jet emission with the compact jet internal shock emission model (ISHEM). This model assumes that the fluctuations of the jet velocity are driven by the X-ray timing proprieties of the source. Our results show that a jet with an electron distribution of p=2.1 can explain the high energy tail observed.

Affiliation

DFC Università di Palermo, INAF/IASF Palermo, IRAP

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: BASSI, Tiziana (Istituto Nazionale di Astrofisica (INAF))

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Presenter: BASSI, Tiziana (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **182** Type: **Poster**

Discussion on the orbital ephemeris of the ADC source X 1822-371

Friday, September 13, 2019 3:30 PM (2 minutes)

The low mass X-ray binary systems (LMXBs) are composed of an accreting neutron star (NS) and a late-type companion (CS). They show very interesting spectral and timing characteristics. We distinguish some typical features in their light curve, like eclipses and dips, depending on the value of the inclination angle between the line of sight with respect to the perpendicular to the orbital plan of the system.
Through a timing analysis of their occurrence we can estimate this period and all the other orbital parameters which define the secular evolution of the system.
The source X 1822-371 is an eclipsing compact binary system with a period close to 5.57 hrs and an orbital period derivative $\dot{P}_{\rm orb}$ of 1.51(7)$\times 10^{-10}$ s/s. The very large value of $\dot{P}_{\rm orb}$ is compatible with a super-Eddington mass transfer rate from the companion star, as suggested by X-ray and optical data. We estimated the number of orbital cycles and the delays of our eclipse arrival times spanning 40 yrs.
Fitting the delays, we found an orbital period $P_{\rm orb} = 5.57062957(20)$ hrs and a $\dot{P}_{\rm orb}$ value of $1.475(54) \times 10^{-10}$ s/s.
The obtained results confirm the scenario of a supper-Eddington mass transfer rate; indeed, we can exclude that the observed delays of the eclipse arrival times could be caused by a gravitational coupling between the orbit and the change in the oblateness of the companion star.

Affiliation

Dipartimento di Fisica e Chimica - Emilio Segrè, Università degli Studi di Palermo

Topic

Primary author: MAZZOLA, Simona Michela (Università degli Studi di Palermo)

Co-authors: Prof. IARIA, Rosario (Università degli Studi di Palermo); Prof. DI SALVO, Tiziana (Università degli Studi di Palermo); Dr GAMBINO, Angelo Francesco (Dipartimento di Fisica, Università degli Studi di Cagliari); Mr MARINO, Alessio (Università degli studi di Palermo); BURDERI, Luciano (University of Cagliari); Dr SANNA, Andrea (University of Cagliari); Prof. RIGGIO, Alessandro (University of Cagliari)

Presenter: MAZZOLA, Simona Michela (Università degli Studi di Palermo)

Session Classification: POSTER SESSION

Contribution ID: **184** Type: **Contributed**

Exploring the Virialization Region of Merging Galaxy Clusters

Tuesday, September 10, 2019 3:20 PM (15 minutes)

X-ray observations of the outskirts of galaxy clusters show that the entropy of the intracluster medium (ICM) in the virialization region is generally less than what is expected based on purely gravitational structure formation. Possible explanations include electron/ion non-equilibrium, accretion shocks that weaken during cluster formation, and the presence of unresolved cool gas clumps. These mechanisms are expected to correlate with large scale structure (LSS), such that the entropy is lower in regions where the ICM interfaces with LSS filaments and, presumably, the warm-hot intergalactic medium (WHIM). Major, binary cluster mergers are expected to take place at the intersection of LSS filaments, with the merger axis initially oriented along a filament. We present results from deep X-ray observations of the virialization regions of binary, early-stage merging clusters, including a possible direct detection of the dense end of the WHIM along a LSS filament.

Affiliation

Harvard-Smithsonian Center for Astrophysics

Topic

Hot and diffuse baryons

Primary author: Dr RANDALL, Scott (Harvard-Smithsonian Center for Astrophysics)

Co-authors: ALVAREZ, G.; PATERNO-MAHLER, R.; BULBUL, E.; SU, Y.; BOURDIN, H.; FORMAN, W.; JONES, C.

Presenter: Dr RANDALL, Scott (Harvard-Smithsonian Center for Astrophysics)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **185** Type: **Poster**

Astrophysics with the Athena/WFI in the 2030ies

Friday, September 13, 2019 8:22 PM (2 minutes)

The Wide Field Imager (WFI) is powerful new spectral-imaging camera for Athena, ESA's next large X-ray observatory to be launched in the early 2030ies. The WFI will provide two defining capabilities to mission, sensitive wide-field imaging spectroscopy over a 40x40 arcmin field of view with an angular resolution of 5" HEW, and the power to observe even the brightest X-ray point sources with very high throughput and low pile-up. In this talk we will present the key science drivers, which include uncovering typical supermassive black hole (SMBH) activity at z>6, into the dark ages where the first stars and galaxies formed; performing a complete and quantified census of black hole activity at z=1-4, including the most obscured objects; pinpointing the hot gas occupying the most massive dark matter haloes at z>2 when the first groups and clusters of galaxies formed; measuring the temperature and abundances of clusters of galaxies out to their virial radius; and performing spectral-timing measurements of bright compact sources to determine the structure of the innermost accreting regions. In addition we will explore further opportunities that will be enabled by the capabilities of the instrument.

Affiliation

MPE Garching

Topic

Future missions

Primary author: Dr RAU, Arne (MPE Garching)

Presenter: Dr RAU, Arne (MPE Garching)

Session Classification: POSTER SESSION

Contribution ID: **186** Type: **Contributed**

A new detection of pulsations from an old ULX

Monday, September 9, 2019 5:55 PM (15 minutes)

We report the detection of pulsations from the archetypal ultraluminous X-ray source (ULX) NGC 1313 X-2. Acceleration searches reveal sinusoidal pulsations in segments of two out of six new observations of this object, with a period of ~ 1.5 s and a pulsed fraction of $\sim 5\%$. We demonstrate that the moderate significances of the individual detections are unlikely to originate in false Poisson noise detections given their very close frequencies, with their similarity in properties to other pulsations from ULXs also arguing they are real. The presence of a large bubble nebula surrounding NGC 1313 X-2 implies an age of order 1 Myr for the accreting phase of the ULX, which implies that the neutron star's magnetic field has not been suppressed over time by accreted material, nor has it collapsed into a black hole, despite an average energy output into the nebula two orders of magnitude above Eddington. This argues that most accreted material has been expelled over the active lifetime of the ULX, favouring physical models including strong winds and/or jets for neutron star ULXs. We also present separate evidence from simultaneous X-ray/optical observations of NGC 1313 X-2 that can be interpreted as precession of its central regions, consistent with super-critical accretion disc models including massive radiatively-driven winds.

Affiliation

Durham University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: ROBERTS, Tim (Durham University)

Co-authors: Mr SATHYAPRAKASH, Rajath (Durham University); Dr WALTON, Dom; FUERST, Felix (ESA/ESAC); Dr BACHETTI, Matteo (Osservatorio Astronomico di Cagliari); PINTO, Ciro (European Space Agency); Dr GRISE, Fabien (Penn State); Prof. KAARET, Philip (University of Iowa); Dr ALSTON, Will (University of Cambridge); Dr EARNSHAW, Hannah (Caltech); Prof. FABIAN, Andy (University of Cambridge); Dr MIDDLETON, Matthew (University of Southampton); SORIA, Roberto (UCAS)

Presenter: ROBERTS, Tim (Durham University)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **187** Type: **Poster**

X-ray/Optical Rapid Timing Correlations and the Resolving of Jet Base Activity in MAXI J1820+070

Friday, September 13, 2019 2:20 PM (2 minutes)

Accreting LMXBs have long been known to emit relativistic jets from regions close to the compact object, but studying these regions is rendered difficult by the prohibitively short time scales associated with the inner jets, and the need to disentangle various compact emission components. In this talk, I will present some of the latest results in this field, where the new NICER instrument provides incredible coverage on last year's outburst of the BHB MAXI J1820+070, showing stunning sub-second variability. Combining with the optical instrument HiPERCAM/GTC, we have probed down to millisecond (optical) scales with unprecedented levels of clarity; a distinct lag in Optical/X-ray correlations of 170 milliseconds is seen in five different bands, with clear separation and differing levels of correlation dependant on wavelength, in accordance with expectations of MHD jet acceleration models. This work represents the highest quality data in the field to-date, greatly extending the work possible at the lower time resolutions of previous observations (such as GX 339-4 and V404 Cyg), and demonstrates the exciting potential of rapid coordinated multi-wavelength timing.

Affiliation

University of Southampton

Topic

Multi-messenger and transient astronomy

Primary author: Mr PAICE, John (University of Southampton)

Co-author: Mr GANDHI, Poshak (University of Southampton)

Presenter: Mr PAICE, John (University of Southampton)

Session Classification: POSTER SESSION

Contribution ID: **188** Type: **Poster**

Time Domain Studies of Neutron Star and Black Hole Populations: The Post Chandra and XMM-Newton Era

Friday, September 13, 2019 2:28 PM (2 minutes)

We present prospects for studying stellar-origin black hole (BH) and neutron star (NS) populations in nearby galaxies, focusing on science topics that require next generation X-ray telescopes. Time domain measurements of BHs and NSs will revolutionize our understanding of their formation and evolution by linking source characteristics to accretion and galaxy parameters. The central themes include studying gravitational wave merger progenitor populations such as Wolf-Rayet X-ray binaries, elucidating the properties of ultraluminous X-ray pulsars that challenge accepted methods of accretion, and investigating various classes of unique transients (e.g., ultraluminous bursts) that remain unexplained. X-ray identification of compact object types also permits, for example, detailed studies of the role of supernova kicks in the dynamical evolution of X-ray binaries. We will present SIXTE simulations of Athena WFI observations of nearby galaxies and summarize the expected improvement in our understanding of these populations, in addition to other phenomena such as obscured HMXBs and Type I X-ray bursts.

Affiliation

NASA/GSFC & University of Maryland College Park

Topic

Multi-messenger and transient astronomy

Primary authors: VULIC, Neven (NASA/GSFC & University of Maryland College Park); HORNSCHEMEIER, Ann (NASA GSFC); Prof. WILMS, Joern (Remeis Observatory / ECAP); ZEZAS, Andreas (University of Crete); BASU-ZYCH, Antara (NASA GSFC); MACCARONE, Tom (Texas Tech University); PTAK, Andrew (NASA GSFC); YUKITA, Mihoko (Johns Hopkins University)

Presenter: VULIC, Neven (NASA/GSFC & University of Maryland College Park)

Session Classification: POSTER SESSION

Contribution ID: **189** Type: **Poster**

The AGN activity in merging galaxies observed in optical and X-ray waveband

Friday, September 13, 2019 5:18 PM (2 minutes)

We will present results from the MAGNA (Multiple AGN Activity) project focused on the detection and study of multiple supermassive black hole systems.
With the main goal of understanding the mechanisms that trigger the AGN in different stages of galaxy mergers, we compare the physical properties of merging galaxies hosting at least one AGN with isolated systems. Optical (SDSS) and X-ray (XMM and Chandra) data sets allowed us to detect and characterize an optically selected sample of merging systems at 20–100 kpc separation, by measuring the accretion rate, the nuclear absorption and (when possible) the BH mass. The talk will reflect on broader implications of these findings when considering the current hydrodynamical and cosmological simulations of merging BH.

Affiliation

INAF/IAPS

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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Co-authors: HUSEMANN, Bernd; VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF)); Dr GUAINAZZI, Matteo (European Space Agency); PÉREZ TORRES, Miguel Angel (Instituto de Astrofisica de Andalucia (IAA-CSIC)); Dr LOISEAU, Nora (ESA); HERRERO-ILLANA, Ruben; KOMOSSA, S. (MPIfR); BIANCHI, Stefano (Università degli Studi Roma Tre); PARAGI, Zsolt

Presenter: DE ROSA, Alessandra (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **190** Type: **Contributed**

Hot ISM in early-type galaxies with stellar and AGN feedback: X-ray diagnostics of the origin and evolution of the hot gas

Tuesday, September 10, 2019 5:25 PM (15 minutes)

A hot plasma is the dominant phase of the ISM of early-type galaxies. Its origin can reside in stellar mass losses, residual gas from the formation epoch, and accretion from outside. Its evolution is linked to the dynamical structure of the host galaxy, to the supernova and AGN feedback heating, and to the (late-epoch) star formation. Observations with XMM-Newton and Chandra have now accumulated a detailed view of the hot gas properties in the local universe. We present two-dimensional, grid-type hydrodynamical simulations, of parsec-scale central resolution, of the hot gas evolution. The simulations include stellar feedback, at the rate predicted by stellar evolution, star formation, and a physically self-consistent treatment of the mechanical (from winds) and radiative AGN feedback; several chemical species, originating in AGB stars and supernovae, have also recently been added, to track the metal enrichment and transportation throughout the galaxy. We will illustrate the X-ray properties of the models and the comparison with those observed in the local universe, focussing on those that proved to be diagnostic of the origin and evolution of the hot gas.

Affiliation

Department of Physics and Astronomy, University of Bologna, Italy

Topic

Hot and diffuse baryons

Primary authors: Prof. PELLEGRINI, Silvia (Department of Physics and Astronomy, University of Bologna); Dr GAN, Zhaoming (Shanghai Astronomical Observatory); Dr CHOI, Ena (Department of Astronomy, Columbia University); Prof. OSTRIKER, Jeremiah P. (Department of Astronomy, Columbia University); Prof. CIOTTI, Luca (Department of Physics and Astronomy, University of Bologna)

Presenter: Prof. PELLEGRINI, Silvia (Department of Physics and Astronomy, University of Bologna)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **191** Type: **Poster**

Accreting magnetars

Friday, September 13, 2019 4:08 PM (2 minutes)

Among High Mass X-ray Binaries, accreting from the stellar wind of its massive OB star companions, there is a growing number of systems in which a magnetized neutron star harboring magnetic fields beyond the quantum critical limit (B>10^13 G) is required to explain the observational properties. Such Accreting Magnetars have been invoked to explain Supergiant Fast X-ray Transients and, more recently, ULXs. However, their existence would challenge the current theories on NS structure and evolution and how NS are born. In this talk I would present recent research on some accreting magnetar candidates, their observed properties, what they tell us about the circumsource environment and the current state of the subject. Prospects for observations with future X-ray missions will also be discussed.

Affiliation

Universidad de Alicante

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: TORREJON, Jose Miguel (Universidad de Alicante)

Presenter: TORREJON, Jose Miguel (Universidad de Alicante)

Session Classification: POSTER SESSION

Contribution ID: **193** Type: **Contributed**

A universal model of black hole accretion uncovering AGN in the Cosmic X-ray background

Wednesday, September 11, 2019 4:50 PM (15 minutes)

From observations of active galactic nuclei (AGN) we may improve our understanding of the growth of black holes across cosmic time and their impact on their host galaxies, but observations alone may be limited by complex biases. Here I will present the results from modeling the whole AGN population while accounting for observational biases.
I will begin by showing that the Eddington ratio distribution for optically-selected AGN is consistent with a broad power-law that is independent of host galaxy type or age. This broad Eddington ratio distribution is also observed in the X-rays, suggesting that a universal Eddington ratio distribution may be enough to describe the full AGN population. From these results, I have expanded a new semi-numerical galaxy formation simulation with a straightforward prescription for AGN accretion. I will show that this simple model for AGN accretion can broadly reproduce the observed properties of X-ray AGN host galaxies and halos. I also find a trend between Eddington ratio distribution and redshift, consistent with the behavior predicted by hydrodynamic simulations.
Finally, I will describe a new synthesis model for the Cosmic X-ray Background based on this semi-numerical model and present our results investigating the physical properties of the AGN population and their host galaxies and halos that contribute to this background emission.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: JONES, Mackenzie (Center for Astrophysics | Harvard & Smithsonian)

Presenter: JONES, Mackenzie (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **194** Type: **Poster**

Obscured AGN in the field of J1030+0524: the X-ray and optical/infrared perspective

Friday, September 13, 2019 6:28 PM (2 minutes)

I will present the X-ray spectral analysis of a sample of obscured AGN candidates in the 17'x17' field surrounding the bright $z = 6.31$ QSO SDSS J1030+0524, observed for 500ks with *Chandra* ACIS-I.
The sample objects are selected to have an hardness ratio $HR > -0.1$, suggestive of the presence of moderate to heavy obscuration ($10^{22} \leq N_H \leq 10^{24}\ cm^{-2}$), and a range of net counts (i.e. background subtracted) from a few tens to hundreds, with a median of ~ 80.

The main goal is to place constraints on the redshifts of the sources, using a multiwavelength approach. Firstly, the analysis has been carried out using X-ray spectroscopy, searching for strong features like the iron $K\alpha$ 6.4 keV emission line and/or the 7.1 keV absorption edge, that is expected to be very deep in obscured objects. Because of the low photon statistics, the resulting X-ray redshift solutions have also been verified using state-of-the-art simulations. Then, using the large photometric coverage in optical/NIR/MIR bands (LBT, CFHT, CTIO and *Spitzer* data), independent solutions are calculated performing photometric redshifts.
The comparison between the X-ray and photometric methods can be an efficient tool to estimate redshifts of high-z obscured AGN, which are usually weak in optical/NIR, possibly making the spectroscopic identification challenging. The obtained redshifts are used to identify the physical properties of the sample, such as the intrinsic luminosity and the absorption column density, as well as the properties of the host galaxies in which the obscured AGN candidates reside.

Furthermore, based on an ongoing optical spectroscopic campaign at the LBT, I am confirming the goodness of this method, which will be useful for future X-ray mission like *eRosita* and *Athena*, but also in other deep fields like the CDF-S, where a fraction of X-ray sources ($\sim 5\%$) are still not detected in other bands.

Affiliation

INAF-OAS Bologna

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: PECA, Alessandro (Istituto Nazionale di Astrofisica (INAF))

Co-authors: VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); GILLI, Roberto (Istituto Nazionale di Astrofisica (INAF)); Dr MIGNOLI, Marco (INAF-OAS)

Presenter: PECA, Alessandro (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **195** Type: **Poster**

Reflection from AGN disks and surroundings, Unification and the CXB

Friday, September 13, 2019 6:24 PM (2 minutes)

Compton thick (CT) AGN are predicted by unified models, which attribute most of the AGN diversity to their inclination, and play an important role for the understanding of the growth of black holes in the early Universe. The fraction of CT AGN at low redshift can be derived from the observed CXB spectrum assuming AGN spectral templates and luminosity functions. We show that high signal-to-noise average hard X-ray spectra, derived from Swift/BAT and NuSTAR, imply that mildly obscured Compton thin AGN feature a strong reflection and contribute massively to the CXB. Thus, a population of CT AGN larger than that effectively detected is not required. The strong reflection observed in mildly obscured AGN, even in individual NuSTAR observations, suggests that the covering fraction of the gas and dust surrounding their central engines is a key factor in shaping their appearance. In addition, NuSTAR observations of AGN show clearly that the reflection behavior varies with the obscuration. The disk is found to be the main reflector in unobscured sources. Instead, obscured objects feature a correlation between reflection and column density, a characteristic of a clumpy reprocessing region located far away.

Affiliation

University of Geneva

Topic

Primary author: PANAGIOTOU, Christos

Co-author: Dr WALTER, Roland (University of Geneva)

Presenter: PANAGIOTOU, Christos

Session Classification: POSTER SESSION

Contribution ID: **196** Type: **Contributed**

The UV-X-ray high-resolution view of outflowing winds in AGN: the case of I Zwicky 1

Wednesday, September 11, 2019 3:45 PM (15 minutes)

Almost twenty years of X-ray grating observations allowed us to characterize the multi-component ionized gas, outflowing from active galactic nuclei, with unprecedented accuracy. XMM-Newton combined with HST have been key in unveiling the secrets of outflowing winds.
Here I will show the results of our most recent multi-wavelength campaign on the narrow line Seyfert 1 IZw1 (230 ks with XMM and 6 orbits of HST time). The simultaneous observation shows a surprising UV-X warm absorber behaviour as well as clearly pointing to a line-driven wind launching mechanism of the plasma (Silva, Costantini et al. 2018). I will show how the observational elements of this and of previous observations clearly challenge the classical view of a conical-shaped outflow in ionization equilibrium. The observational evidences indeed strongly favour episodes of gas ejection, possibly from the accretion disk.

Affiliation

SRON Netherlands Institute for Space Research

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: COSTANTINI, Elisa (SRON, Netherlands Institute for Space Research); Dr SILVA, Catia (SRON Netherlands Institute for Space Research)

Presenter: COSTANTINI, Elisa (SRON, Netherlands Institute for Space Research)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **199** Type: **Poster**

Lessons learned from ULX populations and their environment

Friday, September 13, 2019 3:11 PM (1 minute)

Ultraluminous X-ray Sources (ULXs) are off-nuclear point sources exceeding the Eddington limit for an accreting stellar mass black hole. Their high accretion rates challenge our understanding of accretion physics (e.g. beaming, super-Eddington accretion). The nature of their compact objects and their formation channels are of great interest for the single/binary stellar evolution and the nature of the sources dominating the X-ray output of galaxies. Additionally, as potential progenitors of NS/BH mergers they offer an observational window to the past of gravitational wave sources.

We compile a catalog of galaxies in the local Universe (< 200 Mpc) and using multi-wavelength archival data we estimate their distance, star formation rate, stellar mass, metallicity and AGN content. By cross-matching the galaxy sample with the Chandra Source Catalog 2.0, we construct the largest up-to-date census of ULX populations. We probe the rate of ULXs in early- and late-type galaxies and its scaling with stellar mass (one ULX per $\sim 4.5 \times 10^{11}\ M_{\odot}$) and star formation rate ($\sim$0.6 ULXs per $M_{\odot}\ yr^{-1}$). Finally, we find a negative correlation between the formation rate of ULXs and the metallicity of their host galaxies in the $8 < 12 + \log(O/H) < 9$ range.

Affiliation

University of Crete & IESL/FORTH

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: KOVLAKAS, Konstantinos (University of Crete)

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Presenter: KOVLAKAS, Konstantinos (University of Crete)

Session Classification: POSTER SESSION

Contribution ID: **200** Type: **Poster**

Chemical enrichment in galaxy clusters, groups, and elliptical galaxies hot atmospheres

Friday, September 13, 2019 4:42 PM (2 minutes)

Whereas the extreme conditions of the first minutes after the Big Bang produced nearly all the hydrogen and helium in the Universe, the most common heavier elements - or metals - are synthesized in the core of stars and in supernova explosions. On the other hand, the very hot and diffuse intracluster medium (ICM), glowing in X-ray and detected in the large gravitational potential well of galaxy clusters and groups, is also rich in metals. This means that the building blocks of life, synthesized by billions of supernovae over cosmic ages, are present even at the largest scales of the Universe, as they continuously enrich the ICM.

In this talk, we will see how the abundance measurements of key-elements in the hot atmospheres of galaxy clusters, groups, and ellipticals observed with the current X-ray observatories helps to understand how and which epoch of the cosmic history the ICM got enriched.
Finally, I will discuss how future X-ray observatories will push forward our understanding of the ICM enrichment.

Affiliation

MTA-Eötvös University Lendület, Hot Universe Research Group

Topic

Hot and diffuse baryons

Primary authors: MERNIER, Francois (MTA-Eötvös University Lendület, Hot Universe Research Group); Dr WERNER, Norbert (MTA-Eötvös University Lendület, Hot Universe Research Group); Dr TRUONG, Nhut (MTA-Eötvös University Lendület, Hot Universe Research Group)

Presenter: MERNIER, Francois (MTA-Eötvös University Lendület, Hot Universe Research Group)

Session Classification: POSTER SESSION

Contribution ID: **201** Type: **Poster**

Correlation between X-ray emission and stellar populations: the definitive study of nearby galaxies observed with XMM-Newton

Friday, September 13, 2019 2:41 PM (1 minute)

We present the analysis of all galaxies within a radius of 200 Mpc observed with XMM-Newton. These galaxies are the result of cross-correlation between the XMM-Newton archive and the HECATE catalogue, the most complete galaxy catalogue (~165,000 galaxies) of the local universe incorporating robust distances and stellar population parameters. In our analysis we will use data from all objects observed by XMM-Newton, including those with no formal detections (i.e. upper limits). The sample contains 2500 galaxies observed in more than 2100 observations. Using the full set of archival XMM-Newton data we measure their integrated X-ray luminosity and spectral parameters, in order to study the correlation between X-ray luminosity, star-formation rate, and stellar mass. Since the existing X-ray correlations on star-formation rate and stellar mass have been based on a few dozens of galaxies, this much larger sample provides the opportunity to cover the full range of star-formation rate and stellar mass in the local Universe. In addition the large size of the sample enables us to characterize stochastic effects in these scaling relations.

Affiliation

University of Crete/FORTH

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: ANASTASOPOULOU, Konstantina (University of Crete/FORTH)

Co-authors: ZEZAS, Andreas (University of Crete); Dr HABERL, Frank (MPE-MPG); KOVLAKAS, Konstantinos (University of Crete)

Presenter: ANASTASOPOULOU, Konstantina (University of Crete/FORTH)

Session Classification: POSTER SESSION

Contribution ID: **203** Type: **Contributed**

Sgr A* recent past activity from the X-ray echoes propagating in the Central Molecular Zone

Monday, September 9, 2019 4:10 PM (15 minutes)

Variable X-ray emission from the clouds of the Central Molecular Zone (CMZ) are attributed to the reflection of radiation emitted by the super-massive Black Hole of the Galaxy, Sgr A*, during outbursts occurred in the recent (< 1000 yr) past.
Thanks to a detailed analysis of the XMM and Chandra data of the Galactic Center, based on the comparison of observed spectra and Monte Carlo modelling of the reflection process, we succeeded to determine the line of sight position of a number of molecular clouds that are reflecting the radiation towards us, providing at the same time a significant measurement of the time delay of the events.
This analysis allowed us to prove at the significance level of more than 5 sigma the presence of at least two independent, luminous (1 million times the present Sgr A* X-ray luminosity) events propagating in the CMZ: one short generated about 85 yr back and lasting 1 year and another longer emitted by Sgr A* about 240 yr ago and which lasted about 20 yr. Prospects for determining the X-ray light curve of Sgr A* in the last millennium through this technics are improving and such measurements will surely be completed with the next generation of X-ray instruments.

Affiliation

AstroParticule et Cosmologie, Paris

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Dr GOLDWURM, Andrea (APC / CEA - Paris, France); Dr CHUARD, Dimitri (APC); Dr CLAVEL, Maïca; Dr TERRIER, Régis (APC); Dr PONTI, Gabriele; Prof. MORRIS, Mark (UCLA)

Presenter: Dr GOLDWURM, Andrea (APC / CEA - Paris, France)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **204** Type: **Poster**

A Chandra Legacy Observation of N132D

Friday, September 13, 2019 3:45 PM (1 minute)

N132D is the most X-ray luminous supernova remnant (SNR) in the Local Group with a luminosity of L_x (0.3-10.0 keV) $= 1.0 \times 10^{38}$ ergs/s. Given its location in the Large Magellanic Cloud, it is a prime target for detailed X-ray studies with the Chandra X-ray Observatory. The existing 87 ks Chandra observation of N132D has revealed the complicated spatial and spectral structure of this SNR, but the depth of this observation limits the spatial scale on which detailed spectroscopy may be performed. We successfully proposed for a Chandra legacy observation (900 ks) of N132D that will permit an unprecedented look at the spatial distribution of iron and other heavy elements in the ejecta from this prototypical core-collapse supernova. Combined with supporting multiwavelength data (from radio to gamma rays), these data will inform many areas of active research, including late stages of massive star evolution, explosion mechanisms and dynamics, and physical mechanisms for the interaction of shocks with molecular clouds and cavities. As models of massive stars and their supernovae improve, observations such as the one proposed are the only way to constrain models of massive stars and their supernovae. We will present preliminary results from the observations performed to date.

Affiliation

Harvard-Smithsonian Center for Astrophysics

Topic

Primary author: Dr PLUCINSKY, Paul (Harvard-Smithsonian Center for Astrophysics)

Presenter: Dr PLUCINSKY, Paul (Harvard-Smithsonian Center for Astrophysics)

Session Classification: POSTER SESSION

Contribution ID: **205** Type: **Contributed**

A highly ionised disc wind in Hercules X-1

Tuesday, September 10, 2019 10:00 AM (15 minutes)

Hercules X-1 is one of the best studied accreting neutron star X-ray binaries with a wealth of archival X-ray data. It is well-known for the various time periods in its system: a 35-day period of high, low and short-on flux states, likely caused by a precessing warped accretion disc, a 1.7 day orbital period and a 1.2 sec pulsation period of a neutron star with a ~10^12 G magnetic field. I will present the discovery of a highly ionised disc wind in the X-ray spectrum of Her X-1 when the source is in the high state. The wind detection is statistically significant in nearly all the archival XMM-Newton observations, with velocities ranging from 300 to 900 km/s. Observed features in the iron K band can be explained by both a forest of iron emission lines or by wind absorption. However, we also detect neon and oxygen absorption lines at the same systematic velocity in the high-resolution RGS grating spectra. The very high ionisation degree of the outflowing material (log (ξ/erg cm s-1) = 3.5-4.5) suggests that we are seeing the wind close to its launching point in the accretion disk, and we deduce that the mass outflow rate can be of the same order as the mass accretion rate onto the neutron star. This outflow could be the progenitor of the UV absorption features observed at comparable velocities, but the latter likely originate at much larger distances from the compact object. Possible launching mechanisms will be discussed.

Affiliation

Institute of Astronomy, University of Cambridge

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: KOSEC, Peter (Institute of Astronomy, University of Cambridge); Prof. FABIAN, Andrew (Institute of Astronomy, University of Cambridge); PINTO, Ciro (European Space Agency)

Presenter: KOSEC, Peter (Institute of Astronomy, University of Cambridge)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **206** Type: **Poster**

Physical parameters of the torus from mid-IR and X-ray simultaneous spectral fitting

Friday, September 13, 2019 5:24 PM (2 minutes)

To understand the diversity of classes observed in active galactic nuclei (AGN) it is required to obscure the inner parts of a geometrically and optically thick torus of gas and dust from some lines of sight. However, this torus is not spatially resolved even for the closest AGN. Spectroscopic studies have been broadly used to characterize the main properties of the torus. However, the torus has a large number of parameters that have not been constrained yet. X-rays shows signs of the torus emission throughout the reflection component peaking at ~20 keV. The X-ray spectral shape depends on the geometry of this emission. Mid-infrared emission is another powerful tool to study the properties of the torus, due to the fact that continuum emission in this range is dominated by the heating of dust by the AGN. We explore the combination of X-ray and mid-infrared spectra to constrain the physical parameters of the torus because both show important signatures of obscuration. To meet our goal we used the nearby type-2 IC 5063 as a test object. We included the high spectral resolution IRS/Spitzer spectra for mid-infrared observations and NuSTAR observations for X-rays. We used the radiative transfer code Borus (Baloković et al. 2018) for X-ray spectra and three models (Smooth from Fritz et al. (2006), Clumpy from Nenkova et al. (2008), and CAT3D-wind from Hoenig et al. (2017)) for mid-infrared spectra. The Borus model can be fitted with the X-ray spectral fitting software XSPEC. We develop a code able to convert mid-IR models and IRS/Spitzer spectra into XSPEC format to simultaneously fit mid-infrared and X-ray data. We found that the combination of the borus02 and Smooth models is the best choice to fit the mid-IR and Xspec spectra of IC 5063. Indeed both the inclination angle and the angular width of the torus can be linked indicating that the same structure that produces the reflection component is emitting through dust heating at mid-infrared. This is the first time such behavior is confirmed. Moreover, we found that all dusty torus parameters are found when the inclination and half-opening angles are linked between both baseline models. Therefore, we concluded that this technique can be used to infer the physical properties of the torus.

Affiliation

Instituto de Astronomía y Astrofísica, UNAM

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Ms ESPARZA ARREDONDO, Donaji (Instituto de Radioastronomía y Astrofísica, UNAM); GONZALEZ-MARTIN, Omaira (IRyA); Dr DULTZIN KESSLER, Deborah (IA, UNAM)

Presenter: Ms ESPARZA ARREDONDO, Donaji (Instituto de Radioastronomía y Astrofísica, UNAM)

Session Classification: POSTER SESSION

Contribution ID: **207** Type: **Contributed**

Diffuse X-ray emission around an ultraluminous X-ray pulsar

Monday, September 9, 2019 6:10 PM (15 minutes)

Ultraluminous X-ray sources (ULXs) are extragalactic X-ray emitters located off-center of their host galaxy and with a luminosity in excess of a few 10^{39} erg/s, if emitted isotropically. The discovery of periodic modulation revealed that in some ULXs the accreting compact object is a neutron star (NS), indicating luminosities substantially above their Eddington limit. The most extreme object in this respect is NGC 5907 ULX-1 (ULX1), with a peak luminosity that exceeds by 500 times its Eddington limit. During a Chandra observation to probe a low state of ULX1, we detected diffuse X-ray emission at the position of ULX1. We interpret this extended structure as an expanding nebula powered by the wind of ULX1. Its diameter of $\sim$200 pc, characteristic energy of $\sim$2 keV, and luminosity of $\sim 5 \times 10^{38}$ erg/s imply a mechanical power of $\sim 2 \times 10^{41}$ erg/s and an age $\sim 6 \times 10^{4}$ yr. This proves that a genuinely super-Eddington regime can be sustained for time scales much longer than the spin-up time of the NS powering the system. Since the mechanical power from a single ULX nebula can rival the injection rate of cosmic rays of an entire galaxy, ULX nebulae could be important cosmic ray accelerators.

Affiliation

INAF IASF-MI

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: BELFIORE, Andrea (INAF - IASF Milano)

Co-authors: Dr ESPOSITO, Paolo (INAF-IASF Milano); PINTORE, Fabio (Istituto Nazionale di Astrofisica (INAF)); NOVARA, Giovanni (IUSS Pavia); Dr SALVATERRA, Ruben (INAF-IASF Milano); Dr DE LUCA, Andrea (INAF-IASF Milano); Dr TIENGO, Andrea (IUSS Pavia)

Presenter: BELFIORE, Andrea (INAF - IASF Milano)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **208** Type: **Poster**

Classification of X-ray activities of GRS 1915+105 based on 10-year monitoring with MAXI and Swift.

Friday, September 13, 2019 2:12 PM (2 minutes)

GRS 1915+105 is a black hole X-ray binary known for its characteristic variabilities of X-ray fluxes on timescales of minutes to hours, sometimes showing limit-cycle behavior in its X-ray light curves. More than ten patters of light curves has been recognized and classified. However, its long-term behavior, in particular, transitions among these variability classes have been difficult to study, since their classification required dedicated pointed observations.
Here, we investigated the long-term behavior of GRS 1915+105 using the data obtained over 10 years (2009-2019) with the Gas Slit Camera (GSC) of Monitor of All-sky X-ray Image (MAXI) on the ISS and the Burst Alert Telescope (BAT) of the Neil Gehrels Swift Observatory. MAXI scans the source for about 60 seconds every 92 minutes (ISS orbit). While it is difficult to recognize the variability class by the light curves within such short transits, we find it is possible to classify its activity state using the flux and the hardness ratio averaged over one day. With the appropriate choice of the energy bands for the flux and hardness ratio, the daily X-ray activities of GRS 1915+105 can be classified into four distinct branches in the hardness-intensity diagrams. We also find rules in transitions among the branches.
We attribute these state transitions in GRS 1915+105 to a "state machine" in the GRS 1815+105 system that can hold the memory of its state over several months.
We suspect that the unique temporal behavior of this source among black hole X-ray binaries arises from its unusually large accretion disk.

Affiliation

Department of Physics, Tokyo Institute of Technology

Topic

Multi-messenger and transient astronomy

Primary authors: KAWAI, Nobuyuki (Tokyo Tech); Mr SHIRAISHI, Kazuki (Department of Physics, Tokyo Institute of Technology); Dr TACHIBANA, Yutaro (Tokyo Institute of Technology); Dr SUGITA, Satoshi (Aoyama Gakuin University)

Presenter: KAWAI, Nobuyuki (Tokyo Tech)

Session Classification: POSTER SESSION

Contribution ID: **209** Type: **Poster**

Solving the hard X-rays excess in the NLSy 1 TON S180

Friday, September 13, 2019 6:08 PM (2 minutes)

We present a detailed analysis of a joint *XMM-Newton & NuSTAR* observation of the nearby ($z = 0.062$) luminous NLSy 1 galaxy TON S180 taken in 2016. We find that the observed steep soft excess is likely produced by Comptonization rather than relativistic reflection. By analyzing the broadband SED from 1 eV to 35 keV, we find that the overall intrinsic properties of the continuum can be accounted for by thermal emission from the disc (UV) plus Comptonized emission from the corona at a high fraction ($\sim 70\%$) of the Eddington limit. We also find that there is a weak contribution of disc reflection with a moderate black hole spin.

Affiliation

ESA/ESAC

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: MATZEU, Gabriele (European Space Agency/European Space Astronomy Centre); NARDINI, Emanuele (Istituto Nazionale di Astrofisica (INAF)); Dr PORQUET, Delphine (LAM); Dr REEVES, James (University of Maryland); BRAITO, Valentina; PARKER, Michael (ESA/ESAC); Dr SANTOS-LLEO, Maria

Presenter: MATZEU, Gabriele (European Space Agency/European Space Astronomy Centre)

Session Classification: POSTER SESSION

Contribution ID: **210** Type: **Contributed**

Resolving X-ray Obscuration Biases with Isotropic AGN Selection – First Results from the NuLANDS Legacy Survey

Thursday, September 12, 2019 11:40 AM (15 minutes)

An accurate assessment of the fraction of heavily obscured, "Compton-thick" AGN in the local Universe provides important insights into the composition and structure of AGN X-ray obscuration, as well as its connection with the evolution of supermassive black holes and their surrounding host galaxies. However, current estimates of the Compton-thick fraction vary dramatically between ~20-70%, and it remains unclear whether this large range is driven by selection effects, inadequate sample sizes, luminosity/Eddington rate dependencies or something else entirely. The main handicap of previous works has been the inability to effectively select objects that are *representative* in terms of sampling N(H) parameter space, i.e. are unbiased even by Compton-thick obscuration. To investigate such issues, we present NuLANDS - a large far-infrared legacy survey with the X-ray satellites NuSTAR, XMM-Newton and Swift (more than 4 Ms in total) aimed at constructing an unbiased census of AGN obscuration in the local Universe. The infrared selection using AGN-like colours guarantees that we are not affected by line-of-sight X-ray obscuration biases, even into the log N(H)/cm-2 > 25 regime. In this talk, I will report on multiple new Compton-thick AGN discovered and classified with NuLANDS, complemented with multi-wavelength diagnostics. First results further indicate a Compton-thick fraction > 30% and that hard X-ray selection alone remains biased against the most heavily obscured AGN. NuLANDS marks a major step in completing the local census of accretion activity, and will provide vital boundary conditions for determining the composition of the Cosmic X-ray Background, as well as insights into the densest regions of the AGN torus.

Affiliation

University of Southampton

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: GANDHI, Poshak (University of Southampton); Prof. ALEXANDER, David (Durham University); Dr BALOKOVIĆ, Mislav (Harvard-Smithsonian Center for Astrophysics); Prof. BAUER, Franz (Pontificia Universidad Católica de Chile); Prof. BRANDT, Niel (Penn State University); Dr FARRAH, Duncan (Virginia Tech,); Prof. HARRISON, Fiona; Dr HÖNIG, Sebastian (University of Southampton); Dr KOSS, Michael (Eureka Scientific Inc); Prof. RICCI, Claudio (Universidad Diego Portales (UDP)); Dr STERN, Daniel (Jet Propulsion Laboratory); Prof. TREISTER, Ezequiel (Universidad de Concepción)

Presenter: BOORMAN, Peter (University of Southampton)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **212** Type: **Poster**

Observation of the supernova remnant RX J1713.7-3946 in hard X-rays with INTEGRAL

During Galactic Center survey program by IBIS telescope on-board INTEGRAL the supernova remnant RX J1713.7-3046 was observed in hard X-ray band (17-60 keV) for the first time. The surface brightness maps of the supernova remnant in 17-27-36-50-120 and 17-60 keV energy bands will presented in this talk. The spectra of two brightest clumps of RX J1713.7-3946 are characterized by a power law spectrum with photon index ~3. The surface brightness map of RX J1713.7-3946 in soft X-ray band (1-10 keV), based on the XMM-Newton observations (2001–2017), demonstrates good agreement with that obtained by IBIS telescope, which points out to a single mechanism working in soft and hard X-rays. The XMM-Newton spectrum of RX J1713.7-3046 in the 0.8-10 keV band is well described by the power-law model with photon index ~2, which indicates a change of the spectral slope somewhere between 10 and 17 keV. The value of the slope change (or high-energy cutoff) contains important information about the acceleration efficiency of cosmic ray particles in the supernova remnant.

Affiliation

Space Research Institute of the Russian Academy of Sciences, Profsoyuznaya 84/32, 117997 Moscow, Russia

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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Presenter: Ms KUZNETSOVA, Ekaterina (Space Research Institute of the Russian Academy of Sciences, Profsoyuznaya 84/32, 117997 Moscow, Russia)

Session Classification: POSTER SESSION

Contribution ID: **213** Type: **Contributed**

Connecting the metallicity dependence and redshift evolution of HMXBs

Tuesday, September 10, 2019 10:30 AM (15 minutes)

In the local Universe, it is observed that the X-ray luminosity (L_X) of HMXB populations is correlated with the host galaxy's star formation rate (SFR). Recent X-ray studies of high-redshift galaxies find a positive evolution of this correlation with redshift. This trend is attributed to the formation of more luminous HMXBs in lower metallicity (Z) environments, as predicted by binary population synthesis models. While there is observational evidence that HMXB populations in nearby low-Z dwarf galaxies have enhanced L_X/SFR, the correlation between L_X, SFR, and Z is poorly constrained and, due to the difficulty of obtaining Z measurements at high redshift, it has not yet been proven that the redshift evolution of L_X/SFR is driven by the Z-dependence of HMXBs. Better understanding how HMXB L_X varies with Z and redshift will constrain: (1) whether HMXBs in low-Z environments can be progenitors of the heavy BH binaries discovered by gravitational wave observatories, (2) the contribution of HMXBs to the X-ray heating and reionization of gas in the early Universe, and (3) estimates of HMXB contamination to X-ray searches for low-luminosity AGN and intermediate mass black holes.
We present the results of an X-ray stacking study of star-forming galaxies at z~2, whose goal is to test the connection between the redshift evolution and Z-dependence of HMXBs. Our galaxy sample is selected from the MOSDEF survey, which obtained rest-frame optical spectra of ~1500 galaxies at z~2 in the CANDELS fields. Stacking Chandra data from these fields, we confirm that the L_X/SFR of galaxies at z~2 is enhanced relative to z=0. Splitting our sample into different Z bins, we find a statistically significant decrease of L_X/SFR with Z that is in good agreement with theoretical predictions and with the L_X-SFR-Z relation in the local Universe. Thus, this study provides the first direct evidence that the z-evolution of the HMXB L_X/SFR is indeed driven by metallicity. We also present preliminary results from X-ray stacking studies at lower redshifts, which will better constrain the L_X-SFR-Z relation, enabling more detailed comparisons with theoretical models.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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Presenter: FORNASINI, Francesca (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **217** Type: **Poster**

The properties of extragalactic sources in the Chandra Source Catalog 2.0

Friday, September 13, 2019 5:12 PM (2 minutes)

The Chandra Source Catalog release 2.0 (CSC 2.0) includes all the observations prior to end of 2014, performing detection and extracting source properties, and making them available in an easily accessible format ready for scientific discoveries. The CSC 2.0 covers ~600 deg2 of the sky, sampling widely different astrophysical environments, allowing both galactic and extragalactic studies with large samples of sources. The ~315,000 unique X-ray sources in CSC 2.0 allow scientists to perform statistical studies by making use of the extensive set of uniformly calibrated properties (more than 100/source) in multiple energy bands and across a broad range of source fluxes (5x10^-17 to 10^-12 in the 0.5-2 keV band). Moreover, a large variety of data products are available both at the source level (e.g., spectra, light curves, and more) and at the field level where the source is detected (e.g., merged events files, exposure and background maps). In this talk, I will give a brief overview of the catalog and I will focus on the combination of X-ray and multiwavelength properties for the extragalactic sources, allowing us to to unlock the extreme power of this archive. I will present the source classification based on X-ray plus multi-wavelength data or X-ray only (making use of machine learning methods). I will also showcase the results of the XZ method applied to this dataset to extract redshift information from X-ray spectra of obscured sources.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: CIVANO, Francesca (Center for Astrophysics | Harvard & Smithsonian)

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Presenter: CIVANO, Francesca (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: POSTER SESSION

Contribution ID: **218** Type: **Contributed**

Quantitatively defining consistent relaxed galaxy cluster samples for precision cosmology with impending surveys

Tuesday, September 10, 2019 5:40 PM (15 minutes)

Impending surveys from facilities such as e-Rosita, SPT-3G and Euclid will revolutionize cluster cosmology by yielding samples with $> 10^5$ galaxy clusters, producing an exquisitely detailed 10 Gyr picture of cluster formation. In this new era of precision cluster cosmology dynamically relaxed clusters occupy a special role, enabling a reliable deprojection of ICM properties and reduced systematics associated with mass estimation. However, defining a relaxed cluster is non-trivial. Visual classification, based on a regular morphology and strong central emission, has an inherent lack of objectivity and presents a daunting challenge given the scale of future surveys. In contrast, classifying clusters by measurable image features produces an objective and reproducible method, but is fundamentally a thresholding exercise with arbitrary cut-off values depending on the study. In this talk, we will use mock X-ray observations of the IllustrisTNG, C-Eagle, BAHAMAS and MACSIS simulations to produce a quantitative definition of a relaxed galaxy cluster based on minimizing the scatter in estimated masses. We will examine the high-dimensional relaxation criteria space to explore if the common 3D aperture theoretical and 2D aperture X-ray observable relaxation criteria thresholds can be aligned to yield a consistent sample of relaxed clusters and how this evolves with sensitivity, redshift, numerical resolution and subgrid modelling. Finally, we will assess the impact of a quantitative definition of relaxed on estimated cluster masses, scaling relations and the covariance of cluster observables.

Affiliation

MIT

Topic

Hot and diffuse baryons

Primary author: Dr BARNES, David (MIT)

Co-authors: Ms POP, Roxana (Harvard CfA); Ms PEARCE, Francesca (University of Manchester); Dr KAY, Scott (University of Manchester); Prof. VOGELSBERGER, Mark (MIT)

Presenter: Dr BARNES, David (MIT)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **219** Type: **Poster**

X-RAY TO RADIO STUDIES OF TRANSITIONAL BINARY SYSTEMS

Friday, September 13, 2019 2:22 PM (2 minutes)

Transitional binaries are accreting pulsars observed in both Low Mass X-ray binary (LMXB) and Millisecond Radio Pulsar (MSP) phase.
They are considered the ”smoking gun” of the so-called recycling scenario, first proposed in the 70s to describe the acceleration of radio pulsars to millisecond periods.
They alternatively emit their pulsation in radio or X-rays depending on the accretion phase they are in. Polarimetry measurements of the systems in both states will yield a better determination of the magnetic field at the disk edge in order to study the centrifugal inhibition of accretion of a peculiar propeller state for these systems.
We examine the case of the three known transitional systems for which the combination of radio observations with the Sardinia Radio Telescope (SRT) and the Imaging X-ray Polarimetry Explorer (IXPE) will address a number of unresolved questions on these intriguing objects and on neutron star evolution.
We present the results of simulations which show the feasibility of the expected goals within IXPE observing cycles.

Affiliation

INAF - Osservatorio Astronomico di Cagliari

Topic

Multi-messenger and transient astronomy

Primary authors: PILIA, Maura (Istituto Nazionale di Astrofisica (INAF)); Mr CASULA, Gianluca; Mr STINTINO, Nunzio; Dr XIE, Fei (INAF); POSSENTI, Andrea (Istituto Nazionale di Astrofisica (INAF)); Dr BACHETTI, Matteo (Osservatorio Astronomico di Cagliari); TROIS, Alessio (Istituto Nazionale di Astrofisica (INAF))

Presenter: PILIA, Maura (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **221** Type: **Poster**

Low Mass X-ray Binaries: Not conservative mass transfer and orbital evolution

Friday, September 13, 2019 2:46 PM (2 minutes)

Orbital evolution in Low Mass X-ray Binaries is important in order to define the long-term evolution of these systems and their connection with millisecond pulsars through the recycling scenario. Timing analysis of periodic signals in binaries gives information on their orbital period changes on timespan of tens of years. Although this timespan is still short with respect to the secular evolution of a single source, the study of the results obtained from different systems can give some information on their secular evolution. I will review and update results obtained on the orbital period changes observed both in Low Mass X-ray Binaries and in Accreting Millisecond Pulsars, highlighting their long-term behavior as well as peculiarities and discussing the growing evidences for non-conservative mass transfer in these systems.

Affiliation

University of Palermo

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Prof. DI SALVO, Tiziana (University of Palermo)

Co-authors: Prof. IARIA, Rosario (University of Palermo); Prof. BURDERI, Luciano (University of Cagliari); Dr SANNA, Andrea (University of Cagliari); RIGGIO, Alessandro (University of Cagliari)

Presenter: Prof. DI SALVO, Tiziana (University of Palermo)

Session Classification: POSTER SESSION

Contribution ID: **222** Type: **Contributed**

Unveiling the intrinsic AGN strength in a 12 micron-selected Seyfert 2 sample

Thursday, September 12, 2019 12:10 PM (15 minutes)

The ability of the X-rays to penetrate and measure large columns of obscuring material is crucial to characterise the emission from the Active Galactic Nuclei (AGN), especially those with heavy obscuration and/or weak emission.
In this work we exploit the largest energy band available in the X-rays ($\sim$0.5-30 keV) to accurately assess the intrinsic power and obscuration for a sample of 30 local Seyferts 2, selected from the 12μm galaxy sample (12MGS; Rush, Malkan & Spinoglio 1993).
Coupling the information from the systematic study of the X-ray properties of the proposed sample with the accurate SED decomposition by Gruppioni et al. (2016), which provides a complete characterisation of the source properties, from the small scales (L_{bol}, i.e. the accretion power of the AGN) to the kpc-scales ($M_\star$ and SFR), we obtain a comprehensive picture of the contribution of the AGN in an almost complete Seyfert 2 sample from the 12MGS.
We present i) the first accurate determination of the intrinsic power (L_X) and the column density (N_H) of the obscuring material for the proposed objects; ii) the comparison of the column density (N_H) obtained from the obscuration in the X-rays with that derived from the SED decomposition, parametrised by the optical dept (τ) associated to the 9.7μm absorption feature; iii) for the objects with available interferometric observations of CO emission, assuming a suitable α_{CO} conversion factor, we estimate the host galaxy gas content in order to assess whether the host galaxy contributes in hiding the nucleus.

Affiliation

UNIVERSITA' DI BOLOGNA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: SALVESTRINI, Francesco (DiFA - Università di Bologna); Dr POZZI, Francesca (DiFA - Università di Bologna)

Co-authors: VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); GRUPPIONI, Carlotta (Istituto Nazionale di Astrofisica (INAF))

Presenter: SALVESTRINI, Francesco (DiFA - Università di Bologna)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **223** Type: **Poster**

The Weirdest Objects in the Chandra Source Catalog 2.0. A Machine Learning Approach

Friday, September 13, 2019 3:25 PM (1 minute)

The version 2.0 of the Chandra Source Catalog (CSC2) offers an unprecedented opportunity for serendipitous discovery. Out of $\sim 315,000$ CSC2 sources, two thirds are detected for the first time in X-rays, while a significant fraction of the remaining objects has never been studied in detail. CSC2 sources are characterized in terms of their X-ray fluxes, hardness ratios, variability, and spectral properties, and include a large variety of X-ray phenomena, from young stars, to compact binaries. Our preliminary investigations show that the CSC2 also includes "weird" sources that could be either examples of these known classes, observed in rare or unknown stages of their evolution, or even instances of previously unidentified X-ray source types. We present a machine learning method to maximize the potential for discovery of CSC2, by exploring the catalog using an anomaly detection algorithm, the unsupervised random forest (URF), and report the most unusual sources in the X-ray universe resulting from this search. We identify several rare X-rays sources, including the re-discovery of a γ-ray emitting nova, an ultraluminous stellar-mass black hole, and many more interesting sources that are currently unclassified and that could potentially indicate new types of X-ray sources. We show how our method is a robust and straightforward way to select candidates of unknown class for multi-wavelength and spectroscopic follow up. Although applied to the CSC2, this method is easily adapted for other X-ray catalogs, such as the XMM-Newton Source Catalog.

Affiliation

Center for Astrophysics | Harvard & Smithsonian

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr MARTÍNEZ-GALARZA, Rafael (Center for Astrophysics | Harvard & Smithsonian)

Co-authors: Dr D'ABRUSCO, Raffaele (ievans@cfa.harvard.edu); Dr CIVANO, Francesca (Harvard--Smithsonian centre for Astrophysics); Dr EVANS, Ian (Center for Astrophysics | Harvard & Smithsonian); FABBIANO, Giuseppina (Center for Astrophysics | Harvard & Smithsonian); Dr BURKE, Douglas (Center for Astrophysics | Harvard & Smithsonian)

Presenter: Dr MARTÍNEZ-GALARZA, Rafael (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: POSTER SESSION

Contribution ID: **224** Type: **Contributed**

Heating and Acceleration at Galaxy Cluster Shocks: Insights from NuSTAR

Tuesday, September 10, 2019 3:05 PM (15 minutes)

Mergers between galaxy clusters drive weak shock fronts into the intracluster medium, capable of both heating the gas and accelerating relativistic particles. Measurements of the high temperature gas and non-thermal inverse Compton (IC) emission that result from these shocks most benefit from sensitive observations at hard X-ray energies. NuSTAR observations of the Bullet cluster, Abell 2163, Abell 665, and most recently, Abell 2146–all massive merging clusters–lead to improved measurements of both the thermal and IC components in these clusters. NuSTAR temperature constraints at shock fronts are used to test competing models of electron heating, namely whether electrons are heated directly by the shock or if they reach the shock temperature further behind the front through interactions with ions. In order to resolve the small angular scales necessary to distinguish these models, we develop a joint Chandra-NuSTAR forward-fitting approach of image data, allowing Chandra to determine the density distribution of the gas while NuSTAR constrains its temperature. Interestingly, we measure temperatures in between the predictions of the two models for the Mach 3 shocks in the Bullet cluster and Abell 665, in contrast with temperature constraints from Chandra data alone. In Abell 2146, the temperatures of its two shock fronts are constrained; we find the bow shock temperature to be in good agreement with the Chandra measurement, but the upstream shock–more consistent with expectations–is significantly lower. We will also present constraints on the flux of IC emission from the electrons producing radio halos in all four clusters.

Affiliation

University of Utah

Topic

Hot and diffuse baryons

Primary author: WIK, DANIEL (University of Utah)

Presenter: WIK, DANIEL (University of Utah)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **225** Type: **Poster**

NuSTAR Surveys of M31 and M33: Identifying Black Holes and Neutron Stars in the X-ray Binary Populations of our Nearest Neighbors

Friday, September 13, 2019 4:16 PM (2 minutes)

X-ray binaries (XRBs) trace old and new stellar populations in galaxies, and thus star formation history and star formation rate. X-ray emission from XRBs may be responsible for significant amounts of heating of the early Intergalactic Medium (IGM) at Cosmic Dawn and may also play a significant role in reionization. Until recently, the hard emission from these populations could only be studied for XRBs in our own galaxy, where it is often difficult to measure accurate distances and thus luminosities. The launch of NuSTAR, the first focusing hard X-ray observatory, has allowed us to resolve the brightest XRBs (down to L_X ~ few times 10^{38} erg/s) in galaxies like NGC 253, M83, and M82 up to 4 Mpc away. To reach much lower X-ray luminosities that are more typical of XRBs in the Milky Way ($L_X < 10^{37}$ erg/s), we have observed multiple fields in M31 and M33. In M31, 4 deep fields and 7 shallow fields, totaling roughly 2 Ms, have been executed, while M33 is covered by 3 moderate exposure fields totaling 600 ks. We detect 120 sources in the 4-25 keV band in M31 and over 40 hard band (12-25 keV) accreting black holes and neutron stars, distinguished by their spectral shape in this band. The luminosity function (LF) of the hard band detected sources are compared to INTEGRAL- and Swift/BAT-derived LFs of the Milky Way population, which reveals a possible excess of luminous sources in M31 when correcting for star formation rate and stellar mass. In M33, we find a potentially higher fraction of black hole accreting sources, perhaps related to its higher specific star formation rate. The populations in both galaxies are compared to the total XRB population thus far detected in all the galaxies observed by NuSTAR.

Affiliation

University of Utah

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: WIK, DANIEL (University of Utah)

Presenter: WIK, DANIEL (University of Utah)

Session Classification: POSTER SESSION

Contribution ID: **226** Type: **Poster**

X-ray and SZ scaling relations from galaxies to clusters with the IllustrisTNG simulations

Friday, September 13, 2019 4:50 PM (2 minutes)

The observable thermodynamical properties of the intracluster medium reflect the complex interplay between astrophysical processes such as AGN feedback and the gravitational collapse of the host halo. Using the IllustrisTNG simulations, we measure the X-ray emission and the impact of the gas on CMB through the Sunyaev-Zel'dovich effect over a wide range of mass scales: from galaxies and groups, all the way to the most massive clusters ($M_{500crit} > 10^{15}$ $M_{\odot}$). We calculate the X-ray properties of our simulated haloes using methods that are consistent with observational techniques, which account for the bias and scatter introduced by estimating halo masses. Thus, we infer the scaling relations between X-ray measurements such as the soft-band luminosity and the spectroscopic temperature, hot gas content and Sunyaev-Zel'dovich properties, and we find reasonable agreement between IllustrisTNG and the observed relations. Our work helps to better understand the role played by AGN feedback from cluster to galaxy scales, informing future subgrid BH feedback models. Moreover, our results highlight the scatter and bias introduced by estimated masses, and thus the importance of converting simulated ICM properties to the observable space when comparing simulations to current X-ray observations. Finally, we will provide important predictions for future X-ray missions such as eROSITA, Athena and Lynx regarding the redshift evolution of the X-ray and SZ scaling relations.

Affiliation

Harvard University

Topic

Hot and diffuse baryons

Primary author: POP, Ana-Roxana (Harvard University)

Co-authors: BARNES, David (MIT); Prof. HERNQUIST, Lars (Harvard University); Prof. VOGELSBERGER, Mark (MIT); ILLUSTRISTNG COLLABORATION

Presenter: POP, Ana-Roxana (Harvard University)

Session Classification: POSTER SESSION

Contribution ID: **228** Type: **Contributed**

The demographics and formation rate of X-ray binaries in nearby galaxies

Monday, September 9, 2019 5:25 PM (15 minutes)

Characterization of X-ray binaries on the basis of their donor stars allow us to identify their parent stellar populations and measure directly their formation efficiency as function of their age. Combining this information with constraints on the nature of their compact objects allow us to measure the formation rate of compact objects and their demographics in different types of X-ray binaries. These are key parameters for constraining models of massive stellar evolution and understanding the populations of gravitational wave progenitors and short gamma-ray bursts.
We present results from a Chandra-based study of the formation efficiency of X-ray binaries in the Magellanic Clouds and M81, and a systematic study of the compact object populations in nearby galaxies observed with NuSTAR. We find that High-mass X-ray binaries show enhanced formation rates at ages of ~30-60Myr, with another possible peak around 10Myr. Our analysis of the compact-object populations indicates that more actively star-forming galaxies host a larger fraction of black-hole systems. Furthermore, we see a clear preference for accreting pulsars to be associated with star-forming regions, in good agreement with similar studies in our Galaxy. Finally, we compare these results with predictions from population synthesis models for different star-formation scenarios.

Affiliation

FORTH-IESL / University of Crete

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: ZEZAS, Andreas (University of Crete); Dr ANTONIOU, Vallia (Texas Tech. university / CfA); Dr SELL, Paul (FORTH - IESL); Dr WILLIAMS, Stephen (USNO); Mr MARAGKAKIS, Giorgos-Miltos; HORNSCHEMEIER, Ann (NASA GSFC); LEHMER, Bret (University of Arkansas); VULIC, Neven (NASA/GSFC & University of Maryland College Park); WIK, DANIEL (University of Utah); YUKITA, Mihoko (Johns Hopkins University)

Presenter: ZEZAS, Andreas (University of Crete)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **229** Type: **Contributed**

The unusual broadband X-ray continuum variability seen from Ultraluminous X-ray Sources

Tuesday, September 10, 2019 9:00 AM (15 minutes)

Observational studies of Ultraluminous X-ray Sources (ULXs, L > 1e39 erg/s) have taken on greater siginficance since the discovery that this population is (primarily) made up of X-ray binaries accreting at super-Eddington rates, a result that has been spectacularly confirmed with the detection of coherent pulsations from a growing number of ULXs (requiring neutron star accretors, despite their extreme luminosities). The *NuSTAR* observatory has played a major role in this effort, initially providing the first view of ULXs in the hard X-ray band (E > 10 keV), contributing the first detection of pulsations in a ULX (M82 X-2), and now allowing broadband spectral variability studies to be undertaken. Throughout 2017 we undertook a major, multi-epoch observing campaign on the well-known 'extreme' ULX (L ~ 1e40 erg/s) NGC1313 X-1, combining *XMM-Newton* (800 ks), *Chandra* (500 ks) and *NuSTAR* (500 ks). I will present early results from this large coordinated campaign, focusing on the unusual broadband spectral variability exhibited. Remarkably, we find evidence that the thermal emission that dominates the ~2-10 keV band exhibits two distinct $L \sim T^4$ tracks, implying the presence of two stable radii in the inner accretion flow, separated by a factor of ~4. The source appears to jump between these different radii at different epochs. I will discuss possible interpretations for this strange behaviour, and place the broadband variability seen from NGC1313 X-1 in the context of that seen from the broader ULX sample to date.

Affiliation

University of Cambridge

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: WALTON, Dominic (University of Cambridge); Dr CIRO, Pinto (Cambridge University); Dr NOWAK, Mike (Washington University in St. Louis); ROBERTS, Tim (Durham University); Mr SATHYAPRAKASH, Rajath (Durham University); Dr BACHETTI, Matteo (Osservatorio Astronomico di Cagliari); Dr FÜRST, Felix (ESA); Dr ALSTON, Will (University of Cambridge); Dr KARA, Erin (University of Maryland); KOSEC, Peter (Institute of Astronomy, University of Cambridge); Prof. FABIAN, Andy (University of Cambridge); SORIA, Roberto (UCAS); Dr EARNSHAW, Hannah (Caltech); MIDDLETON, Matthew (University of Southampton); Dr URQUHART, Ryan; Dr GUAINAZZI, Matteo (European Space Agency); Prof. HARRISON, Fiona; Dr STERN, Daniel (Jet Propulsion Laboratory); BARRET, Didier (IRAP); WEBB, Natalie (IRAP); Prof. CANIZARES, Claude (MIT)

Presenter: WALTON, Dominic (University of Cambridge)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **230** Type: **Poster**

Quasars as standard candles

Friday, September 13, 2019 6:34 PM (2 minutes)

The non-linear X-ray to UV relation in quasars can be used to estimate their luminosity. Our analysis of a sample of several thousand quasars with SDSS spectra and X-ray serendipitous observations shows that, quite unexpectedly, the observed dispersion of the relation is almost entirely due to observational effects, while intrinsically the relation holds with a very small dispersion - lower than 0.1 dex- on five orders of magnitudes in luminosity, and over the whole z=0-7 range. This implies that (1) a universal physical mechanism links the accretion disk and the UV-emitting corona, and (2) quasars can be turned into standard candles, and used to measure the expansion of the Universe at high redshift.

Affiliation

University of Florence

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: RISALITI, Guido (Istituto Nazionale di Astrofisica (INAF))

Presenter: RISALITI, Guido (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **231** Type: **Poster**

X-raying winds in distant QSOs: the case of the Einstein Cross

Friday, September 13, 2019 5:04 PM (2 minutes)

The characterization of AGN feedback is still an open issue. Theories and simulations indicate that AGN-galaxy co-evolution and feedback processes could be established through the generation of gas outflows. These are seen to arise from the innermost regions as powerful winds at sub-pc scales, visible in the X-ray band. We present the results from a systematic analysis of all the available *Chandra* and XMM-*Newton* data (as of October 2018) for Q2237+030, the Einstein Cross, a radio-quiet quasar at $z_Q = 1.695$, quadruply-imaged by a spiral galaxy at $z_L = 0.0395$.
We detect, for the first time, a fast X-ray wind in this object outflowing at $v_{out} \simeq 0.1c$, which seems to be powerful enough to significantly affect the host galaxy evolution ($\dot{E}_{kin} \simeq 9\% \, L_{bol}$). Given the absorption features detected throughout the data, we report also on the possible presence of a faster component of the wind ($v_{out} \sim 0.5c$). Evidence for outflows is found in nine spectra out of the sixteen analyzed, which allows us to give a rough estimate of the wind duty cycle as $\sim 50\%$.

Affiliation

DIFA Bologna, OAS Bologna

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: BERTOLA, Elena

Co-authors: DADINA, Mauro (Istituto Nazionale di Astrofisica (INAF)); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); CAPPI, Massimo (Istituto Nazionale di Astrofisica (INAF))

Presenter: BERTOLA, Elena

Session Classification: POSTER SESSION

Contribution ID: **232** Type: **Poster**

A global scenario for accretion/ejection around super massive black holes: the X-ray view

Friday, September 13, 2019 5:38 PM (2 minutes)

In the global scenario proposed by Giustini & Proga (2019), most of the diversity observed in AGN can be explained by different accretion/ejection flows, which depend on the Eddington ratio and on the black hole mass, and therefore on the presence or absence of accretion disc winds driven by radiation pressure.
X-ray observations are crucial to test this scenario: in fact, they allow to constrain the physical properties of both the intrinsic continuum emission region and of the intervening outflowing absorbers, when the most powerful accretion disc winds are intercepted by the line of sight.
We present the current status of the X-ray observations that are able to probe, and therefore prove or disprove, the global scenario proposed by Giustini & Proga; we will then discuss the enormous future observational perspectives given by the X-ray microcalorimeters onboard XRISM and, next and fundamental, ATHENA.

Affiliation

CAB - Centro de Astrobiología (CSIC-INTA)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: GIUSTINI, Margherita (Centro de Astrobiología (CSIC-INTA)); Prof. PROGA , Daniel (Department of Physics & Astronomy, University of Nevada, Las Vegas)

Presenter: GIUSTINI, Margherita (Centro de Astrobiología (CSIC-INTA))

Session Classification: POSTER SESSION

Contribution ID: **233** Type: **Poster**

The place of TDE within the demography of Black Hole accretion

Friday, September 13, 2019 2:02 PM (2 minutes)

Accretion onto a Black Hole seems to be a universal phenomena: it occurs in Black Holes of all masses, from galactic X-ray Binaries with stellar mass Black Holes, to extragalactic Active Galactic Nuclei harboring Supermassive Black Holes. A question naturally arises in this context: is the nature of the accretion onto Black Holes also universal across the mass range? In this work, we extend this question to the Tidal Disruption Events (TDEs). TDE, or the burst of emission due to the tidal disruption of stars by Supermassive Black Holes, is a unique laboratory to probe various high energy astrophysical phenomena much like the X-ray binaries, although in higher black hole masses ($10^{5-8} M_{\odot}$). As such they might be considered as short-lived Active Galactic Nuclei. We try to find the place of these TDEs in the unification scheme of accretion phenomena across the different black hole masses. For this purpose, we selected a sample of TDEs observed by Swift, having a sufficient number of simultaneous UV and X-ray observations, as well as considerable emission in both the energy bands. We compare the UV to X-ray emission from this sample of TDEs with a sample of AGN of different masses and accretion rates, and from galactic Black Holes in the different states. This not only gives us an idea about the place of TDE in the demographic of BH accretions but also provide us more clues about the UV and X-ray emissions of TDEs themselves.

Affiliation

Tata Institute of Fundamental Research, Mumbai

Topic

Multi-messenger and transient astronomy

Primary author: Mr CHAKRABORTY, Sudip (Tata Institute of Fundamental Research, Mumbai, India)

Co-authors: Dr MAGESHWARAN, T. (Tata Institute of Fundamental Research, Mumbai); Prof. RAO, A. R. (Tata Institute of Fundamental Research, Mumbai); Prof. BHATTACHARYYA, Sudip (Tata Institute of Fundamental Research, Mumbai)

Presenter: Mr CHAKRABORTY, Sudip (Tata Institute of Fundamental Research, Mumbai, India)

Session Classification: POSTER SESSION

Contribution ID: **235** Type: **Poster**

Revealing the Compton-thick Active Galactic Nuclei in the Two "Non-merging" Luminous Infrared Galaxies with Broadband X-ray Observations (NGC 5135 and UGC 2608)

Friday, September 13, 2019 7:04 PM (2 minutes)

Recent X-ray studies suggest that mergers play an important role for obscuration of active galactic nuclei (AGNs) in ultra/luminous infrared galaxies (U/LIRGs). Here we analyze the broadband X-ray spectra (0.5-50 keV) of two "non-merging" LIRGs (NGC 5135 and UGC 2608) utilizing the data of NuSTAR, Suzaku, XMM-Newton, and Chandra, in order to search for differences in the torus structure from "merging" U/LIRGs. Applying the X-ray clumpy torus model (XCLUMPY: Tanimoto et al. 2019), we find that both sources show similar spectra characterized by heavily absorption with $N_{\rm H} >\sim$ 1 x 10^{24} cm^{-2}, and the torus angular-width is $\sim<$30 degrees, respectively. The luminosity ratio between the [O IV] 25.89 μm line and 12 μm continuum is consistent with those of typical Seyfert galaxies, also suggesting that the covering fractions of the tori are moderate (Yamada et al. 2019). Our result implies that AGNs in non-merging galaxies tend to be not deeply "buried", in contrast with U/LIRGs in late merging stages.

Affiliation

Kyoto University

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr YAMADA, Satoshi (Kyoto University)

Co-authors: Prof. UEDA, Yoshihiro (Kyoto University); Ms ODA, Saeko (Kyoto University); Mr TANIMOTO, Atsushi (Kyoto University)

Presenter: Mr YAMADA, Satoshi (Kyoto University)

Session Classification: POSTER SESSION

Contribution ID: **237** Type: **Poster**

Feeding neutron stars and black holes by fresh stellar winds

Friday, September 13, 2019 3:38 PM (2 minutes)

High-mass X-ray binaries (HMXB) represent an important evolutionary stage in lives of many massive stars. Significant fraction of HMXBs consists of a neutron star or a black hole deeply embedded in massive donor star wind and accreting its material. We have conducted a survey of HMXBs with the Hubble Space Telescope, and determined stellar wind parameters from measured UV and optical spectra. I will briefly review the main results of this observing campaign which question the leading models explaining different sub-types of HMXBs. I will also briefly review what recent X-ray observations of HMXBs reveal about the structure of donor stellar winds, stellar wind clumping, and large scale corotating interaction regions. Finally, new types of HMXBs with unusual X-ray properties will be presented. These exotic objects may represent still missing links in the evolution of massive binaries towards double degenerate binaries.

Affiliation

Potsdam University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Dr OSKINOVA, Lidia; Dr HAINICH, Rainer; Prof. HAMANN, Wolf-Rainer

Presenter: Dr OSKINOVA, Lidia

Session Classification: POSTER SESSION

Contribution ID: **238** Type: **Contributed**

Super-critical accretion - the case for jetted ULXs

Tuesday, September 10, 2019 9:15 AM (15 minutes)

Accretion is known to occur at rates far in excess of the classical Eddington limit in the local and distant Universe alike. In our Galaxy we are provided with a view of such accretion in the form of the extreme binary SS433, observations of which tell us that mass-loaded outflows and persistent collimated jets are associated features which redistribute energy and matter into the local environment. Although we now have strong evidence that SS433 would appear as an ultraluminous X-ray source (ULX) if viewed face-on, its inclination poses problems for inferring how the jets couple to the accretion flow. In the case of ULXs, we can observe the accretion flow directly and the presence of winds is now well-established. The presence of jets on the other hand has been unclear with the closest match to SS433 –the archetypal ULX, Ho II X-1 –showing ejections which appear to recur only on very long (year) timescales. In this talk I will present the results of our new NICER/VLA/AMI campaign including the discovery that the jets in Ho II X-1, are quasi-persistent which opens the door to causally connecting the inflow and jets at super-critical rates for the first time.

Affiliation

University of Southampton

Topic

Multi-messenger and transient astronomy

Primary authors: Dr MIDDLETON, Matthew (University of Southampton); Dr WILLIAMS, David (University of Oxford); Prof. FENDER, Rob (University of Oxford); Dr ROBERTS, Timothy (University of Durham); Dr MILLER-JONES, James (Curtin University); Dr STEINER, James (MIT); Dr PASHAM, Dheeraj (MIT)

Presenter: Dr MIDDLETON, Matthew (University of Southampton)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **239** Type: **Poster**

Blazar under the lens of future X-ray polarimeters: perspectives for the IXPE mission

Friday, September 13, 2019 8:06 PM (2 minutes)

With the advent of the IXPE (Imaging X-ray Polarimetry Explorer) satellite expected for launch in 2021, the study of the X-ray polarization properties of several bright nearby sources will become possible. Blazars are obvious candidates for X-ray polarization observations. For instance, a high degree of X-ray polarization is expected from high-peaked blazars (HBL) because synchrotron radiation in an ordered magnetic field is naturally polarized. Moreover, X-ray polarization observations have the potential of discriminating between different scenarios for the origin of the X-ray emission in low peaked blazars (LBL) objects.
In this talk, we discuss the perspectives of IXPE observations of blazars, focusing on what we can learn about jets

Affiliation

Italian Space Agency (ASI)

Topic

Future missions

Primary author: Dr DI GESU, Laura (Italian Space Agency (ASI))

Presenter: Dr DI GESU, Laura (Italian Space Agency (ASI))

Session Classification: POSTER SESSION

Contribution ID: **240** Type: **Poster**

Resolving the AGN Torus Spectrally, Spatially, and Temporally

Friday, September 13, 2019 5:02 PM (2 minutes)

The NuSTAR and Swift survey of more than 150 obscured AGN in the local universe recently enabled basic parameters of the obscuring torus, such as the covering factor and the globally averaged column density, to be observationally constrained from the X-ray band. However, detailed analyses of particular AGN reveal that structural parameters of the torus may depend on the choice of the fitting model and its nuisance parameters, variability in intrinsic luminosity or line-of-sight column density, and contamination from non-nuclear emission. In modeling spatially unresolved single-epoch AGN spectra, these effects can be sources of systematic uncertainties that exceed statistical uncertainties on these important structural parameters. In this presentation I will demonstrate how X-ray spectroscopy (either broadband of with high spectral resolution) can be self-consistently combined with spatially resolved and multi-epoch data in order to help us in understanding the complexity of the AGN structure known under the deceptively simple name of the torus.

Affiliation

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: BALOKOVIC, Mislav (Center for Astrophysics | Harvard & Smithsonian)

Co-authors: BUCHNER, Johannes (Max Planck Institute for Extraterrestrial Physics); ELVIS, Martin (Center for Astrophysics | Harvard & Smithsonian); FABBIANO, Giuseppina (Center for Astrophysics | Harvard & Smithsonian)

Presenter: BALOKOVIC, Mislav (Center for Astrophysics | Harvard & Smithsonian)

Session Classification: POSTER SESSION

Contribution ID: **243** Type: **Poster**

Radio morphology-accretion mode link in FRII low-excitation radio galaxies

Friday, September 13, 2019 6:00 PM (2 minutes)

Radio Galaxies (RG) are Radio-Loud Active Galactic Nuclei (AGN) characterized by powerful relativistic jets, oriented at relatively large inclination angles with respect to the observer's line of sight. They are extraordinarily relevant to address important issues such as the interaction between Super Massive Black Holes, the radio jets and their environment.
RGs are commonly classified on the basis of their radio morphology into low radio power FRI (core-dominated) and high radio power FRII (lobe-dominated). Almost all FRIIs hide an efficient accretion disk, while the central engine of FRIs is probably an ADAF, suggesting a strong link between ejection of relativistic plasma and accretion. However, there is a group of FRII sources that does not fit into this picture. They exhibit powerful extended radio structures but inefficient accretion, as attested by their low excitation optical spectra.
In order to investigate their nature, an X-ray systematic analysis of all FRIIs belonging to the 3CR sample with $z < 0.3$ and available Chandra and XMM-Newton observations was performed. We investigate different scenarios and conclude that the evolutionary one is the most probable. FRII-LERGs have indeed intermediate properties (X-ray luminosity, column density and accretion rate in terms of Eddington luminosity) with respect to classical FRIIs and FRIs.
The nuclear power seems to suffer of a depletion of the cold gas reservoir. It is then plausible to think that this information has not yet reached the large-scales radio structures at kpc distances from the central engine. The powerful lobes are the heritage of a past AGN activity at higher efficiency.

Affiliation

DIFA Bologna & INAF-OAS Bologna

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr MACCONI, Duccio (Dipartimento di Fisica e Astronomia, Universita' di Bologna)

Co-authors: TORRESI, Eleonora (Istituto Nazionale di Astrofisica (INAF)); BOCCARDI, Bia (Max Planck Institute For Radioastronomy); GRANDI, Paola (Istituto Nazionale di Astrofisica (INAF)); VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna)

Presenter: Mr MACCONI, Duccio (Dipartimento di Fisica e Astronomia, Universita' di Bologna)

Session Classification: POSTER SESSION

Contribution ID: **246** Type: **Contributed**

Quantifying the rate of dual-AGN with BAYMAX

Thursday, September 12, 2019 10:30 AM (15 minutes)

Despite the importance of dual active galactic nuclei to wide-ranging astrophysical fields such as galaxy formation and gravitational waves, the rate of dual AGNs has yet to be accurately measured. However, the rate of dual AGNs can inform us of the role galaxy mergers play in triggering AGN, timescales for post-merger SMBHs to sink to the center of the potential well (or, the effectiveness of dynamical friction), as well as merger-related feedback physics. Dual AGNs that are widely separated relative to the instrument PSF and have near unity flux ratios are easy to identify, however dual AGNs with small separations and/or flux ratios can only be distinguished from a single AGN with advanced statistical analysis. As a result, very few dual AGNs have been confirmed, and most have physical separations > 1 kpc. We have developed BAYMAX (Bayesian AnalYsis of Multiple AGN in X-rays), a tool that uses a Bayesian framework to quantitatively evaluate whether a given source in a Chandra observation is actually a single or dual point source, for flux ratios $0.1<f<1.0$ (representing the flux ratio of the secondary to the primary AGN) and angular separations below 0.5". Specifically, we present results from BAYMAX analyzing Chandra observations of a variety of sources such as: the lowest-mass dual AGN candidate to date (SDSS J091449.05), and a sample of AGN classified as dual from optical narrow-line diagnostics but whose X-ray emission remains ambiguous. With BAYMAX we are (1) discovering a dual AGN population where past spatial resolution limits have prevented systematic analyses and (2) unveiling the true nature of confirmed dual AGNs in the literature. Overall, BAYMAX will be an important tool for correctly classifying candidate dual AGNs, and, for first time, studying the dual AGN population across cosmic time.

Affiliation

University of Michigan

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: FOORD, Adi (University of Michigan)

Co-authors: GULTEKIN, Kayhan (University of Michigan); HODGES-KLUCK, Edmund (University of Maryland / NASA GSFC)

Presenter: FOORD, Adi (University of Michigan)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **252** Type: **Invited**

20 years of Chandra Science, and a Look Forward to new Science Prospects

Thursday, September 12, 2019 4:50 PM (25 minutes)

I will summarise Chandra's scientific legacy during the first 20 years of operation. This includes key results across the full range of astrophysics enabled by Chandra's unique spatial resolution, spectral resolution, broad dynamic range and longevity, as well as its'major impact on our community. Looking forward to the next 10 years, I will summarise Chandra's current status, and the rich prospects for future new science, particularly as multiple new missions and telescopes (e.g. EHT, LIGO/Virgo, e-ROSITA, JWST, XRISM, LSST, SDSS-V etc.) mature and/or come on line over the next few years.

Affiliation

CfA, United States

Topic

Future missions

Primary author: Dr WILKES, Belinda (CfA)

Presenter: Dr WILKES, Belinda (CfA)

Session Classification: FUTURE MISSIONS

Contribution ID: **254** Type: **Poster**

X-Ray Census of Millisecond Pulsars in the Galactic Field

Friday, September 13, 2019 3:17 PM (1 minute)

We have conducted a systematic survey for the X-ray properties of millisecond pulsars (MSPs). Currently, there are 47 MSPs with confirmed X-ray detections. We have also placed the upper limits for the X-ray emission from the other 36 MSPs by using the archival data. We have normalized their X-ray luminosities L x and their effective photon indices Γ into a homogeneous data set, which enables us to carry out a detailed statistical analysis. Based on our censored sample, we report a relation of $Lx\ 10^{31.05}(\dot{E}/10^{35})^{1.31} ergs^{-}1$ (2-10 keV) for the MSPs. The inferred X-ray conversion efficiency is found to be lower than the previously reported estimate that could be affected by selection bias. L x also correlates/anti-correlates with the magnetic field strength at the light cylinder B LC/characteristic age τ. On the other hand, there is no correlation between L x and their surface magnetic field strength B s . We have further divided the sample into four classes: (i) black-widows, (ii) redbacks, (iii) isolated MSPs, and (iv) other MSP binaries, and compare the properties among them. We noted that while the rotational parameters and the orbital periods of redbacks and black-widows are similar, L x of redbacks are significantly higher than those of black-widows in the 2-10 keV band. Also the Γ of redbacks are apparently smaller than those of black-widows, which indicates that the X-ray emission of redbacks are harder than that of black-widows. This can be explained by the different contribution of intrabinary shocks in the X-ray emission of these two classes.

Affiliation

Chungnam National University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Mr JONGSU, Lee (Chungnam National University); Prof. C. Y., Hui (Chungnam National University)

Co-authors: Prof. JUMPEI, Takata (Huazhong University of Science and Technology); Prof. A. K. H., Kong (National Tsing Hua University); Prof. P. H. T., Tam (Sun Yat-sen University); Prof. K. S., Cheng (University of Hong Kong)

Presenter: Mr JONGSU, Lee (Chungnam National University)

Session Classification: POSTER SESSION

Contribution ID: **255** Type: **Poster**

X-ray Dust Scattering towards the Galactic Center

Friday, September 13, 2019 3:06 PM (1 minute)

The Galactic Centre (GC) region contains many bright X-ray sources and has a high column density of foreground gas and dust. This suggests that X-ray dust scattering should be ubiquitous and intensive in the GC direction. In this poster, I will show our latest results of discovering significant dust scattering effects for a few bright X-ray sources in the GC. The effects include the existence of an extended X-ray halo around each point-like source, the extra dust scattering opacity imprinted in the X-ray spectrum which causes the spectral disagreement between different instruments and source extraction regions, and the change of apparent variability of XRB due to the smearing of foreground dust scattering. Our studies show that foreground dust scattering is a ubiquitous and important phenomenon that should be considered properly for the spectral-timing study of X-ray sources in the GC. We have created XSPEC models to correct for the dust scattering opacity of a few GC sources.

Affiliation

National Astronomical Observatories (NAOC), CAS

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: JIN, Chichuan (National Astronomical Observatories (NAOC), CAS)

Co-authors: Dr PONTI, Gabriele; Dr HABERL, Frank (MPE-MPG); Prof. SMITH, Randall; Dr VALENCIC, Lynne

Presenter: JIN, Chichuan (National Astronomical Observatories (NAOC), CAS)

Session Classification: POSTER SESSION

Contribution ID: **257** Type: **Poster**

RWI in disks around high spin black hole: how does it impact the observables

Friday, September 13, 2019 2:24 PM (2 minutes)

The Rossby-Wave Instability (RWI) has been proposed as the origin of the fast quasi-periodic variability (HFQPOs) observed in black-hole binaries. Here we are using NOVAs, our Numerical Observatory of Violent Accreting systems, to follow the evolution of the RWI arising in the accretion disk of a black-hole for a large range of spin. The first aim is to prove the ability of the RWI to modulate the X-ray fluxes in a similar way as is observed.
But, thanks to NOVAs we can go further and explore possible imprint of the RWI in other observables.

Affiliation

APC universite Paris 7

Topic

Multi-messenger and transient astronomy

Primary authors: VARNIERE, Peggy (APC Universte Paris 7); Dr VINCENT, Frederic (Observatoire de Paris); Dr CASSE, Fabien (APC universite paris 7)

Presenter: VARNIERE, Peggy (APC Universte Paris 7)

Session Classification: POSTER SESSION

Contribution ID: **258** Type: **Poster**

Extended X-ray Emission Around Wolf-Rayet Stars: Circumstellar Structure and Evolution

Friday, September 13, 2019 3:23 PM (1 minute)

We discuss the hot gas detected in X-rays around Galactic Wolf-Rayet stars. In particular, we discuss the XMM-Newton detection of extended X-ray emission from the Wolf-Rayet ring nebula NGC 3199, unveiling the powerful effect of the fast wind from WR 18. The X-ray emission is brighter in the region southeast of the star and an analysis of the spectral properties of the X-ray emission reveals abundance variations: (i) regions close to the optical arc present nitrogen-rich gas enhanced by the stellar wind from WR 18 and (ii) gas at the eastern region exhibits abundances close to those reported for the nebular abundances derived from optical studies, which is a signature of an efficient mixing of the nebular material with the stellar wind. The dominant plasma temperature and electron density are estimated to be T $\approx$ 1.2 $\times$ 10^6 K and n_e = 0.3 cm^{-3} with an X-ray luminosity in the 0.3-3.0 keV energy range of L_X = 2.6 $\times$ 10^{34} erg s^{-1}, which is not atypical of hot bubbles around massive stars, but which is lower than expected from standard wind-blown bubble theory. We discuss the implications in particular with respect to nebulae around apparent runaway Galactic Wolf-Rayet stars.

Affiliation

ESA / ESAC

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: MARSTON, Anthony (ESA / ESAC)

Co-authors: Dr TOALA, Jesus (UNAM); Dr GUERRERO, Martin (IAA-CSIC)

Presenter: MARSTON, Anthony (ESA / ESAC)

Session Classification: POSTER SESSION

Contribution ID: **259** Type: **Poster**

The First Hard X-Ray Survey of the Central 30 Parsec of the Galactic Center Searching for Faint High Mass X-Ray Binaries

Friday, September 13, 2019 4:28 PM (1 minute)

This investigation reports the finding of three potential High Mass X-ray Binary (HMXB) candidates using Nuclear Spectroscopic Telescope Array (NuSTAR) in the central 30 parsec of the Galactic Center (GC) near the supermassive black hole Sagittarius A*. With the follow-up data of the GC by NuSTAR which observed 70 new hard X-ray sources, we aimed to search for faint HMXBs. To determine high-mass infrared counterparts of M ⊠ 10 M⊙, we utilized the Spitzer IRAC GC survey and conducted source registration on Chandra observations to minimize the absolute astrometric errors, which are unique for each observation. Various characteristics of these HMXB candidates including stellar types, pulsations, and luminosities were analyzed by spectral and timing analysis. This was followed by a stellar density calculation to further verify that the high-mass infrared counterparts are associated with each of its HMXB candidates. This investigation shows the likelihood of the existence of other faint HMXBs in the GC that are undiscovered due to lack of sensitivity of previous telescopes.

Affiliation

Taft School

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Mr KIM, Yi Won; Mr JANG, Jung Kyu; Mr WANG, Eric

Presenter: Mr KIM, Yi Won

Session Classification: POSTER SESSION

Contribution ID: **260** Type: **Contributed**

An Accretion-Ejection paradigm for compact objects

Tuesday, September 10, 2019 9:30 AM (15 minutes)

Powerful accretion processes around black holes (BH) in X-ray binaries or AGN give birth to High energy emission from UV to X-rays/gamma-rays. While the BHs strongly differ in terms of mass in these objects, their close environment shows clear similarities with the presence of (1) an optically thick accretion disk, (2) a hot plasma (the so-called corona) producing hard X-rays through comptonisation of the disk photons, and (3) winds and/or powerful jets. We have developed an accretion-ejection model composed of a Jet Emitting Disk (JED), below a transition radius Rj, and a standard accretion disk (SAD) beyond. In JED, jets carry away a large part of the disk angular momentum resulting in higher accretion speed and lower density than in SAD. The radial temperature and optical depth of the JED-SAD are derived by solving for the thermal structure of the accretion flow. The global SEDs are then self-consistently obtained by radial integration. Playing with the accretion rate feeding the system and the transition radius Rj, we can reproduce all the different spectral states of XrBs during their outburst as well as the evolution of the radio emission. This model has been applied with success to the different outbursts of GX 339-4 observed by RXTE/PCA (Marcel et al. 2018a,b, 2019 sub.). We will discuss the implications of these results for GX339-4. We will also present the recent applications to other XrBs (like the outlier H1743-322) and to AGNs.

Affiliation

Institute of Planetary science and Astrophyscics of Grenoble

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: PETRUCCI, pierre-olivier (Institute of Planetary science and Astrophysics of Grenoble); Dr MARCEL, Gregoire (Villanova University); Prof. FERREIRA, Jonathan (IPAG); Dr CLAVEL, Maica (IPAG); Mr BARNIER, Samuel (IPAG); Mr BENITAH, Thomas (IPAG); ET AL.

Presenter: PETRUCCI, pierre-olivier (Institute of Planetary science and Astrophysics of Grenoble)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **261** Type: **Poster**

Chandra observations of the AS0295 cluster

Friday, September 13, 2019 4:44 PM (2 minutes)

Mergers between clusters of galaxies are highly energetic events capable of drastically changing the observed properties of clusters. Therefore, merging events provide a unique set-up for the study of cluster physics and the behavior of the interaction between gas, stars and dark matter.

We present the results of the X-ray analysis of the AS0295 cluster, a low redshift (z=0.3), massive cluster caught in the process of merging. Chandra X-ray images show a disturbed morphology, with X-ray emission elongated in the SE-NW direction. While the secondary cluster has a clearly visible X-ray peak and cool gas (~6 keV) associated with it, the primary has a flatter surface brightness distribution and a high temperature (~9.5 keV), similar to the mean temperature of AS0295.

We detected several merging signatures, such as a cold front close to the secondary's core, a plume of cool gas emerging from primary cluster and two possible shocks: one in the vicinity of primary and the other leading the secondary.

Comparing the X-ray information with literature results of binary merger simulations, we discuss the dynamical state of AS0295. Moreover, published optical and radio studies of this cluster show the presence of an offset between gas and dark matter in the primary cluster and radio emission associated with this system. Having all this complementary information about AS0295 cluster, we show that this system represents a promising candidate for the understanding of the process of cluster merging and the nature of dark matter.

Affiliation

Stefan cel Mare University, Romania

Topic

Hot and diffuse baryons

Primary author: PASCUT, Aurelia

Co-author: Prof. HUGHES, John (Rutgers University, USA)

Presenter: PASCUT, Aurelia

Session Classification: POSTER SESSION

Contribution ID: **262** Type: **Poster**

Unveiling multiphase quasar-driven outflows in PG 1114+445

Friday, September 13, 2019 6:42 PM (2 minutes)

Supermassive black hole (SMBH) winds are believed to be a key player in the evolution of galaxies. In fact, outflows from active galactic nuclei (AGN) may be one of the fundamental mechanisms by which a SMBH transfers a significant fraction of its accretion energy to the surrounding environment. Disk-scale ionized ultra-fast outflows (UFOs) and large-scale warm absorbers (WAs) are commonly found in the X-ray spectra of many Seyfert galaxies and quasars. Even though a correlation between these two absorbers has been suggested in the past, a direct link is still missing. Here we present the analysis of 12 XMM-Newton EPIC spectra in which, together with WA and UFO, we found a 'low-ionization UFO'. This absorber has the same velocity as the UFO ($v \sim 0.15c$), but ionization and column density comparable with the WA ($\log(\xi/\mathrm{erg\ cm\ s\hat{}\{-1\}}) \sim 0.5$ and $\log(N_H/\ \mathrm{cm\hat{}\{-2\}}) \sim 21.5$, respectively). Moreover, independently on the assumption of either momentum- or energy-conserving UFO-WA interaction, this absorber shows a low value of the clumpiness, $Cv \sim 10^{-3}$. This strongly suggests that this absorber is produced by the interaction between the UFO on the surrounding WA, and that such interaction occurs via entraining of a fast UFO on the WA, pushing a fraction of clumps to comparable velocities, producing the observed 'entrained ultra-fast outflow' (E-UFO).

Affiliation

INAF - Osservatorio Astronomico di Brera

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: SERAFINELLI, Roberto (Istituto Nazionale di Astrofisica (INAF))

Co-authors: TOMBESI, Francesco (University of Rome "Tor Vergata"); VAGNETTI, Fausto (Istituto Nazionale di Astrofisica (INAF)); PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF)); GASPARI, Massimo (Princeton University); Dr SATURNI, Francesco Gabriele (Istituto Nazionale di Astrofisica (INAF))

Presenter: SERAFINELLI, Roberto (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **263** Type: **Poster**

What can we learn from ULXs variability?

Friday, September 13, 2019 4:00 PM (2 minutes)

ULXs are extra-galactic X-ray binaries with X-ray luminosities in excess of 10^{39} erg s^{-1}, the Eddington limit for accretion onto a ~10M_{sun} object. They are composed of a compact object and a companion star. The nature of the compact object is still not clear: it could be a neutron star, a stellar mass black hole or an intermediate mass black hole. Since measuring the mass is not feasible in most cases, we are studying different approaches in order to gain insight onto the nature of these elusive objects. In particular I will address the variability of ULXs as a class, both in brightness and spectral shape. My work focuses on the study of variability on timescales from weeks to years.
I will show the result from the analysis of all the X-ray data of the Cartwheel galaxy, a spectacular example of collisional ring galaxy which hosts the largest number of ULXs for a single galaxy. I will also present the long term variability characteristics of a sample of ULXs observed by Swift.
I will discuss my findings in the context of black hole and neutron star variability.

Affiliation

INAF Osservatorio Astronomico di Brera; Dipartimento di Fisica G. Occhialini, Università degli Studi di Milano - Bicocca, Piazza della Scienza 3, 20126 Milano, Italy

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: SALVAGGIO, Chiara (Istituto Nazionale di Astrofisica (INAF)); WOLTER, Anna Luisa Maria (Istituto Nazionale di Astrofisica (INAF)); PINTORE, Fabio (Istituto Nazionale di Astrofisica (INAF))

Presenter: SALVAGGIO, Chiara (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **264** Type: **Invited**

High-redshift accreting SMBHs in the X-rays

Thursday, September 12, 2019 3:15 PM (25 minutes)

Deep X-ray observations provide unprecedented insights into the physical properties and evolution of the accreting SMBH population in the early universe. I will present recent results on the bulk of the $z > 3$ AGN population, constituted by low- and moderate-luminosity AGN, based on the deepest Chandra surveys to date. I will focus in particular on the AGN X-ray luminosity function, which carries information about the mechanisms responsible for the formation of SMBHs and the onset of the BH-galaxy co-evolution, and on the evolution of the obscured AGN fraction from the local Universe to $z > 3$. I will also discuss the X-ray properties of the population of optically selected luminous QSOs at $z > 6$, exploiting both archival data (15 objects) and new Chandra observations (10 objects). In particular, X-ray photometric analysis of one of our new targets suggests that it is the first heavily obscured ($\log N_H \approx 24$) QSO candidate known at $z > 6$. Finally, I will discuss how future X-ray observatories (Athena, Lynx, AXIS) will dramatically improve our knowledge of SMBH formation and early growth at $z \approx 6 - 15$.

Affiliation

PUC (Chile), CASSACA (China)

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: VITO, Fabio

Presenter: VITO, Fabio

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **265** Type: **Poster**

Arcus, The Soft X-ray Grating Explorer

Friday, September 13, 2019 8:24 PM (2 minutes)

Arcus will provide high-resolution soft X-ray spectroscopy in the 12-50Å bandpass with sensitivity orders of magnitude higher than any previous astronomical observatory. Its capabilities include spectral resolution >2500 and effective area of ~250 cm^2. The three top science goals for Arcus are to (1) measure the effects of structure formation imprinted upon the hot baryons that are predicted to lie in extended halos around galaxies, groups, and clusters, (2) trace the propagation of outflowing mass, energy, and momentum from the vicinity of the black hole to extragalactic scales as a measure of their feedback and (3) explore how stars, circumstellar disks and exoplanet atmospheres form and evolve. Arcus relies upon the same 12m focal length grazing-incidence silicon pore X-ray optics (SPO) that ESA has developed for the Athena mission; the focal length is achieved on orbit via an extendable optical bench. The focused X-rays from these optics are diffracted by high-efficiency Critical-Angle Transmission (CAT) gratings, and the results are imaged with flight-proven CCD detectors and electronics. The power and telemetry requirements on the spacecraft are modest and mission operations are straightforward, as most observations will be long, uninterrupted, and pre-planned.

Affiliation

Smithsonian Astrophysical Observatory

Topic

Future missions

Primary author: Dr SMITH, Randall (SAO)

Presenter: Dr SMITH, Randall (SAO)

Session Classification: POSTER SESSION

Contribution ID: **266** Type: **Poster**

NICER measurements of variability time scales i supersoft X-ray sources.

Friday, September 13, 2019 3:36 PM (2 minutes)

We present NICER observations in which the modulations of the X-ray flux in two supersoft X-ray sources were measured with unprecedented data quality. We observed two luminous targets, CAL 83 in the LMC with its intriguing 67 seconds periodicity, and MR Vel in the Galaxy. We discuss the results in the context of the structure and evolution of the two binaries, especially focusing on what they reveal on shell nuclear burning.

Affiliation

INAF-Padova (Italy) and Department of Astronomy, University of Wisconson, madison, WI (USA)

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: ORIO, Marina (Istituto Nazionale di Astrofisica (INAF))

Co-authors: Dr DOBROTKA, Andrej (Slovak University of technology); Prof. BEHAR, Ehud; Dr NESS, Jan-Uwe (European Space Agency); Mr PEI, Songpeng (Padova University); Mr SUN, Tom (Det. of Astronomy, University of Wisconsin)

Presenter: ORIO, Marina (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **267** Type: **Poster**

A joint NICER and XMM-Newton view of the "Magnificent" thermally emitting X-ray Isolated Neutron Star RX J1605.3+3249

Friday, September 13, 2019 3:21 PM (1 minute)

Thermally emitting X-ray isolated neutron stars represent excellent targets for testing cooling surface emission and atmosphere models, which are used to infer physical parameters of the neutron star. Among the seven known members of this class, RX J1605.3+3249 is the only one that still lacks confirmation of its spin period. Here we analyze NICER and XMM-Newton observations of RX J1605.3+3249, in order to address its timing and spectral behavior. Contrary to a previous tentative detection, but in agreement with the recent work by Pires et al. (2019),
we find no significant pulsation with pulsed fraction higher than 1.3% (3\sigma) for periods above 150 ms. We also find a limit of 2.6% for periods above 2 ms, despite searches in different energy bands. The X-ray spectrum can be fit by either a double-blackbody model or by a single-temperature magnetized atmosphere model, both modified by a Gaussian absorption line at ~0.44 keV. The origin of the absorption feature as a proton cyclotron line or as an atomic transition in the neutron star atmosphere is discussed. The predictions of the best-fit X-ray models extended to IR, optical and UV bands are compared with archival data. Our results are interpreted in the framework of a fallback disk scenario.

Affiliation

NASA-MSFC/USRA

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: MALACARIA, Christian (NASA-MSFC/USRA)

Co-authors: Dr BOGDANOV, Slavko (Columbia Univ.); Dr HO, Wynn (Haverford/Southampton); Dr ENOTO, Teruaki (Kyoto Univ.); Dr RAY, Paul (NRL); Dr ARZOUMANIAN, Zaven (NASA-GSFC); Dr CAZEAU, Thoniel (NASA-GSFC); Dr GENDREAU, Keith (NASA-GSFC); Dr GUILLOT, Sebastien (IRAP, CNRS); Dr GUVER, Tolga (Istanbul Univ.); Dr JAISAWAL, Gaurava (DTU Space, Denmark); Dr WOLFF, Michael (NRL)

Presenter: MALACARIA, Christian (NASA-MSFC/USRA)

Session Classification: POSTER SESSION

Contribution ID: **268** Type: **Poster**

The BH XRB researches highlighted with Insight-HXMT

Friday, September 13, 2019 2:08 PM (2 minutes)

Black hole X-ray binareis show variability in flux on timescales of milliseconds to hours. It can probes the inner region of the accretion disk around BH. Insight-HXMT, the first Chinese X-ray astronomical satellite, was successfully launched on 2017 June 15. Its broad energy band (1-250 keV), large area in the hard ener-gy band (~5000 cm^2 20-250 keV), and good time resolution provides us an exciting opportunity to study the spectral-timing properties of the X-ray binary systems especially at a higher energy. Here We will present the timing properties of new transient such as MAXI J1535-571, MAXI J1820+070, and MAXI J1348-630, and known transients like GRS 1915+105 observed with Insight-HXMT.

Affiliation

Key Laboratory of Particle Astrophysics, Institute of High Energy Physics, Chinese Academy of Sciences

Topic

Multi-messenger and transient astronomy

Primary author: Mr HUANG, Yue

Co-authors: Prof. QU, JinLu; Prof. ZHANG, ShuangNan; ZHANG, Shu (Institute of High Energy Physics)

Presenter: Mr HUANG, Yue

Session Classification: POSTER SESSION

Contribution ID: **269** Type: **Poster**

Burst probe to XRB accretion and Insight-HXMT observation

Friday, September 13, 2019 4:22 PM (2 minutes)

Although corona has been being well used in modelling accretion of XRBs, especially on aspects of the spectral state transitions and correlation with launching of a jet, so far its nature is still less known, especially on aspect of the formation mechanism. To probe this puzzle observationally, one has firstly to have a proper probe like the intense short soft X-ray shower, since the corona is in definition less emissive and can only be lighted up with the incident soft X-rays. This probe, however, falls short in BH XRBs, but fits well the thermal nuclear flashes occurring on the NS surface. We therefore took the type-I burst to probe the accompanied disk/corona evolution and obtained an atoll sample which shows that corona can be cooled off by the burst shower. Further studies suggest that, a variety of issues apart from corona can be addressed as well by taking this probe. The current shortage in observations at hard X-rays is the relatively poor statistics of the data, which can be diminished by the HXMT mission.

Affiliation

Institute of High Energy Physics,Beijing China

Topic

Primary author: ZHANG, Shu (Institute of High Energy Physics)

Presenter: ZHANG, Shu (Institute of High Energy Physics)

Session Classification: POSTER SESSION

Contribution ID: **270** Type: **Solicited**

The Imaging X-Ray Polarimetry Explorer

Friday, September 13, 2019 9:40 AM (20 minutes)

Almost half a century will have passed since the first satellite experiment to attempt to measure the polarization of non-solar X-ray sources, the Bragg crystal polarimeter aboard the Orbiting Solar Observatory number 8, was performed. NASA's Small Explorer Mission, the Imaging X-ray Polarimetry Explorer (IXPE), which I have the privilege to be the Principal Investigator of, is scheduled for launch in early 2021. IXPE will be much more powerful than the instrument aboard OSO-8 and is based on a very different technology. Using revolutionary and advanced technology developed in Italy, the IXPE detector's exploit the capability to track the photoelectron produced in the initial interaction of the incident X-ray with the gas in an imaging proportional counter. Coupling the detectors with X-ray optics to render the background essentially negligible results in a polarimeter that can produce time and/or energy resolved images of the brighter and most interesting X-rays sources, namely neutron stars and black holes. We present an overview of the design of IXPE and its capabilities including highlights of several astrophysically important and unique experiments that will be performed.

Affiliation

NASA/MSFC

Topic

Future missions

Primary author: WEISSKOPF, Martin (NASA/Marshall Space flight Center)

Presenter: WEISSKOPF, Martin (NASA/Marshall Space flight Center)

Session Classification: FUTURE MISSIONS

Contribution ID: **271** Type: **Poster**

A tidal disruption event in an AGN

Friday, September 13, 2019 2:14 PM (2 minutes)

We report the the discovery of a Tidal Disruption Event (TDE) occurred in the Active Galactic Nuclei. The X-ray spectral properties and the broad optical emission lines detected in the SDSS spectrum clearly revealed the AGN nature, with black hole mass of $\sim 10^6\ M_\odot$ and Eddington ratio of $\lambda_{Edd} = 0.6$. A sudden increase in flux during the second half of 2009 is shown in the long-term optical, UV and NIR light curves. After an initial decline, a plateau phase evidently emerged in the NUV and optical \textit{u, g, r, i} light curves. The plateau phase in the NUV band is likely lagged behind the optical ones by approximately 70–80\,days with also a much shorter duration, i.e. ∼7–15\,days against ∼40–50\,days. The long-term light curves in the NUV and optical bands (after the plateau phase), as well as in the infrared band (\mission{VISTA} NIR and \mission{WISE} MIR), can be well fitted with a power-law with the form $f(t) = A * (t - t_0)^{-\beta}$. The value of β depends on the wavelength band, with β ∼0.7–1.0 in the NUV/optical bands, ∼2.1–2.7 in the NIR \textit{J, H, K_S} bands, and ∼1.2–1.4 in the MIR bands. The characteristics of the long-term multi-band light curves suggest that the observed increase in multi-band flux are caused by a TDE. The difference in the β value for different bands may indicate that the radiation in the optical/UV, MIR and NIR are from distinct regions which is in agreement with the scenario that the NIR and MIR flares are the echoes of the primary optical/UV emission. The lag between the NUV and optical plateau phase and the duration of the plateau phases, may imply that the optical/NUV flares are originated from the accretion disc. {\color{orange}The plateau phase can be due to viscosity decay after the stellar debris interacting with the accretion disc of AGN, while the lag can be explained with the viscosity time-scale.}

Affiliation

National Astronomical Observatories, Chinese Academy of Sciences

Topic

Multi-messenger and transient astronomy

Primary author: Dr LIU, Zhu (National Astronomical Observatories, Chinese Academy of Sciences)

Presenter: Dr LIU, Zhu (National Astronomical Observatories, Chinese Academy of Sciences)

Session Classification: POSTER SESSION

Contribution ID: **272** Type: **Poster**

Nature of the coronal emission in Active Galactic Nuclei

Friday, September 13, 2019 6:30 PM (2 minutes)

The X-ray spectrum from the corona of an AGN is generally approximated as a power law up to certain energies after which the spectrum turns over called as cut-off energy. Thus, the two main observables in the X-ray spectrum of an AGN are the power law photon index and the energy at which the cut-off occurs. This high energy cut-off is a manifestation of the temperature of the electrons in the corona which is inferred to be around 2-3 times the electron temperature. Therefore, constraining the temperature of the corona in AGN is very important to understand the physical processes happening close to their central regions. Observations from INTEGRAL and Swift/BAT have provided high energy cut-off measurements (found to be at around tens of keV) in a few AGN, however, with large uncertainties. Observations with NuSTAR is better poised to provide measurements of the coronal temperature of AGN owing to its focusing capability and better sensitivity compared to INTEGRAL and Swift/BAT. To determine the physical parameters of the corona, it is very important to have broadband X-ray data. Towards this, we have selected a sample of Seyfert galaxies having NuSTAR data and have combined this with data from Suzaku and XMM. Simultaneous model fits were performed to derive the coronal properties of our sample. Results of this systematic study will be presented at the meeting.

Affiliation

Indian Institute of Astrophysics

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Ms RANI, Priyanka (Indian Institute of Astrophysics)

Co-author: Prof. STALIN, C. S. (Indian Institute of Astrophysics)

Presenter: Ms RANI, Priyanka (Indian Institute of Astrophysics)

Session Classification: POSTER SESSION

Contribution ID: **273** Type: **Poster**

Neutron Star Population Expected in Galactic Center Region

Friday, September 13, 2019 3:07 PM (1 minute)

We discuss the emission properties of the population of neutron stars that is expected to be present in the innermost parts of the Galactic center. Part of the population of isolated neutron stars should propagate supersonically through denser ionized streams of the Minispiral (Sgr A West), forming bow shocks where particles are accelerated and expected to produce polarized X-ray synchrotron signal. We investigate whether the polarized X-ray emission from Galactic center neutron star bow shocks could be potentially detectable in the framework of future X-ray polarimetry. To this end, we explore the distribution of different interaction modes within the environment and the observability of the resulting bow-shock nebulae.

Affiliation

Astronomical Institute, Czech Academy of Sciences

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Prof. KARAS, Vladimir (Astronomical Institute, Czech Academy of Sciences); Dr ZAJACEK, Michal (Center for Theoretical Physics, Polish Academy of Sciences); Prof. ECKART, Andreas (I. Physikalisches Institut, Universitaet zu Koeln)

Presenter: Prof. KARAS, Vladimir (Astronomical Institute, Czech Academy of Sciences)

Session Classification: POSTER SESSION

Contribution ID: **274** Type: **Review**

Cosmology with galaxy clusters: the role of X-rays

Tuesday, September 10, 2019 4:30 PM (30 minutes)

Galaxy clusters are dark-matter dominated systems enclosed in a volume that is a high-density microcosm of the rest of the universe. Clusters are thus excellent laboratories for probing the physics of the gravitational collapse of dark matter and baryons. As cluster growth and evolution depend on the underlying cosmology, their number density as a function of mass and redshift, spatial distribution and internal structure are powerful cosmological probes.
I will review what we have learned on the use of X-ray to map their dominant baryonic component and to infer their intrinsic properties, and what we need to understand through a fruitful use of the upcoming X-ray projects and observatories to construct a consistent picture of the formation and composition of galaxy clusters.

Affiliation

INAF OAS Bologna

Topic

Primary author: ETTORI, Stefano (Istituto Nazionale di Astrofisica (INAF))

Presenter: ETTORI, Stefano (Istituto Nazionale di Astrofisica (INAF))

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **275** Type: **Solicited**

The Transient High-Energy Sky and Early Universe Surveyor (THESEUS)

Friday, September 13, 2019 10:00 AM (20 minutes)

The Transient High-Energy Sky and Early Universe Surveyor (THESEUS) is a space mission concept currently under Phase A study by ESA as candidate M5 mission, aiming at exploiting Gamma-Ray Bursts for investigating the early Universe and at providing a substantial advancement of multi-messenger and time-domain astrophysics. Through an unprecedented combination of X-/gamma-rays monitors, and on-board IR telescope and automated fast slewing capabilities, THESEUS will be a wonderful machine for the detection, characterization and redshift measurement of any kind of GRBs and many classes of X-ray transients. In addition to the full exploitaiton of high-redshift GRBs for cosmology (pop-III stars, cosmic re-ionization, SFR and metallicity evolution up to the "cosmic dawn"), THESEUS will allow the identification and study of the electromagnetic counterparts to sources of gravitational waves which will be routinely detected in the late '20s / early '30s by next generation facilities like aLIGO/aVirgo, LISA, KAGRA, and Einstein Telescope (ET), as well as of most classes of transient sources, thus providing an ideal sinergy with the large e.m. facilities of the near future like LSST, ELT, TMT, SKA, CTA, ATHENA.

Affiliation

INAF - OAS Bologna

Topic

Future missions

Primary author: AMATI, Lorenzo (INAF .- IASF Bologna)

Presenter: AMATI, Lorenzo (INAF .- IASF Bologna)

Session Classification: FUTURE MISSIONS

Contribution ID: **276** Type: **Poster**

Disentangling the dependence of AGN variability on physical parameters in the Chandra Deep Field South

We explore the dependence of Active Galactic Nuclei from the BH mass and luminosity for the ~30 supermassive BHs with mass estimates in the Chandra Deep Field south. With this dataset we can test wether the results are consistent with the models based on low-redshift AGNs, and validate the use of AGN variability to estimate the accretion history of SMBH as well as for future cosmological applications.

Affiliation

Università di Napoli Federico II

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary authors: Prof. PAPADAKIS, Iossif (University of Crete); PAOLILLO, Maurizio (Istituto Nazionale di Astrofisica (INAF))

Presenter: PAOLILLO, Maurizio (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **277** Type: **Poster**

The connection of star-forming rates in galaxies with black hole accretion rates of AGNs

Friday, September 13, 2019 6:48 PM (2 minutes)

An important problem in extragalactic astronomy concerns the influence of the presence of active nucleus (AGN) on the large-scale processes in the host galaxy and the correlation between the evolution of the host galaxy and the supermassive black hole (SMBH) in its centre. This connection between galaxies and SMBHs is suggested by the observed tight correlation between the evolution of star-formation rates (SFRs) and AGN activity. But the complexity of separation the radiation of the AGNs from that of the host galaxies over a wide range of redshift and in different wavebands remains one of the essential problems in this topic.

The identification of AGNs in large digital sky surveys is further complicated due to the radiation contamination by star-forming regions and other objects in the host galaxy. The solution of this issue requires the adoption of various selection criteria (and their combination) based on the properties of AGN emission in different wavebands, e.g. optically obscured AGNs can be identified only from their radiation in mid-infrared and X-ray bands.

We present the analysis and correlations of AGNs identification methods in X-ray full, soft and hard bands using the data from XMM-Newton Serendipitous Source Catalogue (3XMM-DR8). For determination of the black hole accretion rates and studying of its correlation with SFRs, it was used the values of stellar mass and star-formation rate of the host galaxies of X-ray selected AGNs from the 8th Data Release of Sloan Digital Sky Survey (SDSS DR8) performed by MPA-JHU group (galSpec catalogue).

Affiliation

University Federico II in Naples

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: TORBANIUK, Olena (Department of Physics "E. Pancini", University Federico II in Naples)

Co-authors: PAOLILLO, Maurizio (Istituto Nazionale di Astrofisica (INAF)); Prof. LONGO, Giuseppe (Istituto Nazionale di Astrofisica (INAF))

Presenter: TORBANIUK, Olena (Department of Physics "E. Pancini", University Federico II in Naples)

Session Classification: POSTER SESSION

Contribution ID: **278** Type: **Poster**

A New Sample of Soft X-ray dominated AGNs

Friday, September 13, 2019 6:44 PM (2 minutes)

Ordinary Type 1 AGNs show X-ray spectra dominated by a hard power law sometimes accompanied by soft X-ray excess emission and only a limited number of AGNs are known to show soft X-ray dominated spectra, which are reminiscent of high/soft or very high state of Galactic black holes. We present our selection of soft X-ray dominated AGNs using the XMM-Newton serendipitous source catalogue. We apply conditions of small hardness ratios, sufficient full band counts, and construct a sample of 12 soft X-ray dominated AGNs, for which detailed X-ray spectral analysis has not published. Nine among them show extremely soft X-ray spectra represented by a power law with a photon index of 3-4. Their spectra are not compatible with ordinary soft excess represented by thermal emission with kT=0.1 - 0.2 keV. Their 2-10 keV luminosities are in the wide range of 2x10^40-2.5x10^45 erg s^-1. We will summarize their X-ray properties and UV to X-ray SEDs.

Affiliation

Ehime University

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Prof. TERASHIMA, Yuichi (Ehime University)

Presenter: Prof. TERASHIMA, Yuichi (Ehime University)

Session Classification: POSTER SESSION

Contribution ID: **279** Type: **Invited**

Probing cluster formation from cosmic noon to cosmic dawn

Tuesday, September 10, 2019 5:00 PM (25 minutes)

The study of the formation of galaxy clusters is incomplete without connecting measurements of clusters at low redshifts to their progenitor structures in the early universe. New surveys are now finding significant numbers of these cluster progenitors at $z > 2$ with relative ease. While some of these are associated with powerful active galaxies (radio galaxies and quasars) that are good signposts for the progenitors of massive central cluster galaxies, the majority of structures being identified today are found based on large-scale overdensities of galaxies in deep, wide optical surveys, enhancements in the hydrogen optical depth as measured by tomographic studies of the intergalactic medium, and large spatial excesses of redshifted dust continuum emission from cluster-forming regions. These large structures of galaxies may furthermore have played an important role in the reionization of the universe, which can be tested by upcoming experiments. In this talk, I will review our current understanding of this rapidly growing field and the main challenges in the next decade.

Affiliation

Observatório Nacional, Rio de Janeiro, Brazil

Topic

The cosmic frontier: first black holes and proto-clusters

Primary author: Dr OVERZIER, Roderik (Observatório Nacional)

Presenter: Dr OVERZIER, Roderik (Observatório Nacional)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **280** Type: **Solicited**

XRISM: mission status

Friday, September 13, 2019 9:20 AM (20 minutes)

X-Ray Imaging and Spectroscopy Mission (XRISM) is the mission to resume high resolution X-ray spectroscopy with imaging once realized but unexpectedly terminated by a mishap of Hitomi. This innovative, JAXA-led international project being developed in collaboration with NASA, ESA, and other world wide partners, focuses on large scale flows of energy and matter in the universe with the high-resolution X-ray spectroscopy. XRISM carries a 6 x 6 pixelized X-ray micro-calorimeter array on the focal plane of an X-ray mirror assembly, and an aligned X-ray CCD camera covering the same energy band and a wider field of view. This paper introduces science objectives, and the project status of XARM.

Affiliation

ISAS/JAXA, Saitama University

Topic

Future missions

Primary authors: TASHIRO, Makoto (Saitama University); THE XRISM TEAM

Presenter: TASHIRO, Makoto (Saitama University)

Session Classification: FUTURE MISSIONS

Contribution ID: **281** Type: **Invited**

Mapping the disc-corona geometry in accreting black holes

Wednesday, September 11, 2019 12:10 PM (25 minutes)

In the past decade, spectral-timing measurements of accreting black holes have revealed reverberation light travel echoes between the X-ray emitting corona, and the accretion disc. Together, XMM-Newton, NuSTAR, Swift and NICER have measured light echoes from size scales ranging from the broad line region down to the ISCO. In this talk, I will give an overview of the progress over the past decade on disc reverberation mapping, and will conclude with a look to the future, with new high throughput missions, and complimentary constraints from high-resolution X-ray spectroscopy missions, like XRISM and Athena.

Affiliation

MIT

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Prof. KARA, Erin (MIT)

Presenter: Prof. KARA, Erin (MIT)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **282** Type: **Poster**

Scattered X-Ray Radiation in Obscured Active Galactic Nuclei

Friday, September 13, 2019 5:40 PM (2 minutes)

Accreting supermassive black holes, also known as active galactic nuclei (AGN), are surrounded by large quantities of gas and dust. Based on the column density of the material in the line of sight, AGNs can be classified as obscured and unobscured. In the case of obscured AGNs, the torus depletes most of the light produced by the accreting black hole and a useful way to study them is in the X-rays, which can penetrate large column densities. By utilizing the data provided by the 70-month Swift/BAT all-sky survey in the hard X-ray regime (14-195 keV), we study the properties of Thomson scattered X-ray radiation for a sample of local (z<0.1) AGNs and the relation between the fraction of scattered radiation and the physical properties of the black hole.

Affiliation

Universidad Diego Portales, Santiago, Chile

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Ms GUPTA, Kriti Kamal (Universidad Diego Portales, Santiago)

Co-author: Prof. RICCI, Claudio (Universidad Diego Portales (UDP))

Presenter: Ms GUPTA, Kriti Kamal (Universidad Diego Portales, Santiago)

Session Classification: POSTER SESSION

Contribution ID: **283** Type: **Invited**

Absorption and accretion properties of local Active Galactic Nuclei

Thursday, September 12, 2019 11:15 AM (25 minutes)

X-ray emission is an ubiquitous property of Active Galactic Nuclei and, being produced within a few gravitational radii from the supermassive black hole, can provide fundamental information about the structure and geometry of the circumnuclear material, as well as on the characteristics of the accretion flow. In my talk I will present recent studies of the obscuration and accretion properties of local AGN, focussing on the results obtained from the Swift/BAT AGN Spectroscopic Survey.

Affiliation

Universidad Diego Portales, Chile; Kavli Institute for Astronomy and Astrophysics, China; George Mason University, USA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Prof. RICCI, Claudio (Universidad Diego Portales)

Presenter: Prof. RICCI, Claudio (Universidad Diego Portales)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **284** Type: **Review**

Formation and growth of the earliest supermassive black holes

Thursday, September 12, 2019 2:30 PM (30 minutes)

Determining the processes responsible for the initial formation and subsequent growth of the very first supermassive black holes, primarily taking place at very high redshifts (z>6), will be a major challenge for the next decade of X-ray astronomy and beyond. I will review what is currently known about black hole growth during this early period of cosmic time (from both an X-ray and multiwavelength perspective), discuss some of the latest progress in understanding the evolution of AGN populations at lower redshifts, and look ahead to the next generation of X-ray observatories - in particular the potential of the Athena X-ray observatory to identify large samples of moderate-luminosity z>6 AGN.

Affiliation

University of Leicester

Topic

The cosmic frontier: first black holes and proto-clusters

Primary author: AIRD, James (University of Leicester)

Presenter: AIRD, James (University of Leicester)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **285** Type: **Invited**

Recent progress on X-ray study of supernova remnants as remnants of supernovae

Tuesday, September 10, 2019 11:30 AM (25 minutes)

Supernovae are one of the most energetic explosion events in the universe, with the human detectability not only in electromagnetic wave but also neutrino and possibly gravitational wave. They also play the main role of chemical evolution of the universe. On the other hand, the explosion mechanism in detail is still unclear. We will summarize recent X-ray observations of remnants of supernovae which shows us new information on explosion mechanism.

Affiliation

The University of Tokyo

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr BAMBA, Aya (U. of Tokyo)

Presenter: Dr BAMBA, Aya (U. of Tokyo)

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **286** Type: **Invited**

Multi-wavelength observations of tidal disruption flares

Monday, September 9, 2019 2:30 PM (25 minutes)

The tidal disruption of a star by a massive black hole is a rare event that results in a spectacular flare of electromagnetic radiation. Visible from radio to X-ray wavelengths, tidal disruption flares are a unique probe to study massive black holes and the nucleus of their host galaxies. The advent of optical transient surveys has accelerated this field; the increased detection rate has fueled a large number of (often unexpected) discoveries. However the origin of optical emission from tidal disruption events is currently unknown; observations at X-ray wavelengths will be key to solve this puzzle.

Affiliation

NYU

Topic

Multi-messenger and transient astronomy

Primary author: VAN VELZEN, Sjoert (NYU)

Presenter: VAN VELZEN, Sjoert (NYU)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **287** Type: **Review**

X-raying the Milky Way Center

Monday, September 9, 2019 3:40 PM (30 minutes)

The heart of the Milky Way is a laboratory for high energy astrophysics, containing the Galactic supermassive black hole, thousands of X-ray point sources and prominent diffuse X-ray emission. I will review our knowledge of the present and past activity from the supermassive black hole as well as its relation to the recently discovered outflow connecting the central parsecs to the base of the Fermi bubbles.

Affiliation

INAF OA Brera

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: PONTI, Gabriele (Istituto Nazionale di Astrofisica (INAF))

Presenter: PONTI, Gabriele (Istituto Nazionale di Astrofisica (INAF))

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **288** Type: **Solicited**

Future NASA X-ray Astronomy Missions and Concepts

Friday, September 13, 2019 11:00 AM (20 minutes)

This talk will summarize the status of and prospects for future NASA X-ray astronomy missions. Although there is only one NASA X-ray astronomy mission currently under development (the Imaging X-ray Polarimetry Explorer), there are several promising candidates for selection over the next 2-3 years through NASA's Small and mid-sized Explorer (SMEX and MIDEX) solicitations, including Arcus and Survey and the Time-domain Astrophysical Research eXplorer (STAR-X). More importantly, a number of studies of "probe-class"(~$1B) and strategic X-ray mission studies have been conducted over the past 3-4 years in anticipation of the 2020 Decadal Survey of Astronomy and Astrophysics. Among these are the strategic Lynx concept and the probe class AXIS, STROBE-X, TAP, IPP, and HEX-P. Also, a major component of NASA's X-ray astronomy strategy remains participation in major non-US missions, such as JAXA's XRISM and ESA's Athena. Each of the NASA-led missions and NASA roles in non-US missions, and the science enabled by them, will be briefly described.

Affiliation

NASA / GSFC

Topic

Future missions

Primary authors: PETRE, Robert (NASA / GSFC); VALINIA, Azita (NASA Goddard Space Flight Center)

Presenter: VALINIA, Azita (NASA Goddard Space Flight Center)

Session Classification: FUTURE MISSIONS

Contribution ID: **289** Type: **Review**

Accreting black holes in X-ray binaries

Monday, September 9, 2019 4:55 PM (30 minutes)

I will review recent (and not so recent) results on accretion and ejection processes in X-ray binaries.

Affiliation

IRAP (CNRS / Universite de Toulouse)

Topic

Multi-messenger and transient astronomy

Primary author: Dr MALZAC, Julien (IRAP (CNRS / Universite de Toulouse))

Presenter: Dr MALZAC, Julien (IRAP (CNRS / Universite de Toulouse))

Session Classification: COMPACT AND DIFFUSE SOURCES IN GALAXIES & IN THE GALACTIC CENTER

Contribution ID: **290** Type: **Poster**

Extended X-ray Emission Near PG1407+265

Friday, September 13, 2019 6:10 PM (2 minutes)

We report Chandra observations of the environment of the unusual redshift 1 quasar PG1407+265 and discuss a new X-ray cluster found 1 arcminute from it. We discuss the X-ray variability of the quasar and estimate the cluster contribution to the X-ray flux in previous lower resolution observations. Optical observations complement the Chandra data and allow us to estimate the physical properties of the cluster.

Affiliation

Center for Astrophysics

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Dr MCDOWELL, Jonathan (Center for Astrophysics)

Co-authors: Prof. BLUNDELL, Katherine (Oxford University); Dr SIEMIGINOWSKA, Aneta (Center for Astrophysics); Dr GALLO, Luigi (St Mary's Univ. Halifax)

Presenter: Dr MCDOWELL, Jonathan (Center for Astrophysics)

Session Classification: POSTER SESSION

Contribution ID: **291** Type: **Poster**

Identifying Counterparts for the Pulsar-like Unidentified Hard Gamma-ray Objects

Friday, September 13, 2019 3:02 PM (2 minutes)

Using machine learning techniques, we have picked pulsar-like gamma-ray sources from the unidentified objects in the third Catalog of Hard Fermi LAT sources (3FHL). In order to further pinpoint their nature, we have performed a systematic search for the X-ray and optical/IR counterparts of these short-listed 3FHL sources.

Affiliation

Department of Astronomy & Space Science Chungnam National University Daejeon, Korea (ROK)

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: HUI, David C. Y.

Co-authors: LEE, Jongsu; KIM, Sangin; LI, K.L.; OH, Kwangmin; LUO, Shengda; LEUNG, Alex P.; TAKATA, J.; KONG, A.K.H.; CHENG, K.S.

Presenter: HUI, David C. Y.

Session Classification: POSTER SESSION

Contribution ID: **292** Type: **Review**

X-ray observations of the physics in galaxy clusters

Tuesday, September 10, 2019 2:20 PM (30 minutes)

Galaxy clusters are the ideal locations to study the interplay between active galactic nuclei, hot and cold baryons, dark matter and cluster mergers. X-ray observations are very powerful to study these physical processes, as they let us directly see the hot baryons, the dominant baryonic component. I will review what deep X-ray observations have shown us about feedback in the cores of galaxy clusters. In addition, I will discuss what observations tell us about processes in the intracluster medium, such as sloshing and enrichment. Finally, I will highlight advances future X-ray observatories could bring.

Affiliation

Max Plank Institute for Extraterrestrial Physics

Topic

Hot and diffuse baryons

Primary author: SANDERS, Jeremy (Max Planck Institute for Extraterrestrial Physics)

Presenter: SANDERS, Jeremy (Max Planck Institute for Extraterrestrial Physics)

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **293** Type: **Review**

Physics of AGN

Wednesday, September 11, 2019 10:10 AM (30 minutes)

Recent advances in the physics of AGN will be discussed, including the likelihood that the pair thermostat operates and controls the temperature of the corona. Also new high density reflection models now give improved fits to X-ray spectra of AGN with black hole masses below 100 million Msun, enabling the surface density of the disk to be determined.

Affiliation

University of Cambridge UK

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: FABIAN, Andrew

Presenter: FABIAN, Andrew

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **294** Type: **Solicited**

Current Status and Plan of the enhanced X-ray Timing and Polarimetry (eXTP) Observatory

Friday, September 13, 2019 11:20 AM (20 minutes)

The enhanced X-ray Timing and Polarimetry (eXTP), a large international space science mission led by China with major contributions from many European countries and other international partners, is designed to study fundamental physics under extreme conditions of density, gravity and magnetism. eXTP will carry two sets of focusing X-ray telescopes for spectroscopy (9 telescopes) and polarimetry (4 telescopes) observations, 40 modules of collimated X-ray detectors for timing observations, and a wide field monitor made of 4 cameras. The mission aims at determining the equation of state of matter at supra-nuclear density, measuring effects of QED, and understanding the dynamics of matter in strong-field gravity. In addition to investigating fundamental physics, eXTP will be a very powerful observatory for astrophysics that will provide observations of unprecedented quality on a variety of galactic and extragalactic objects. As the core of a large science program called "Explore the eXtreme Universe"(EXU) in China, eXTP is a high priority mission in China's space science program before 2030 and through 2035. The Phase B study of eXTP has been approved in China, targeting for launch around 2027 with a nominal mission lifetime designed for 5-8 years.

Affiliation

Institute of High Energy Physics, Chinese Academy of Sciences

Topic

Future missions

Primary author: Prof. ZHANG, Shuang-Nan (Institute of High Energy Physics)

Presenter: Prof. ZHANG, Shuang-Nan (Institute of High Energy Physics)

Session Classification: FUTURE MISSIONS

Contribution ID: **295** Type: **Poster**

Phase Lags on High Frequency Quasi-Periodic Oscillations in the transient source XTE 1701-462

Friday, September 13, 2019 3:42 PM (1 minute)

Variability in the emission of neutron stars and black holes X-ray binaries is a very puzzling field of study: the nature of the mechanism that produces the oscillations is still a subject of debate and unravelling this mystery could bring us closer to understand the physics in extreme environments like the ones around compact objects. Using Fourier techniques in X-ray timing analysis, we study archival RXTE observations of the unique transient neutron star X-ray binary: XTE 1701-462. These observations show the source transitioning from Z state into atoll state, while kHz QPOs (quasi-periodic oscillations at kHz Fourier frequencies) are present in its light curve. We analyse the power and lag spectra of each observation to measure the time delay between the hard and soft X-ray emission of the source around the QPOs frequencies. Studying this particular source, using X-ray timing techniques, could give us an important understanding into the differences between atoll and Z sources, especially regarding the different timing behaviour (strength and intensity of the variability) that we see in them. Preliminary results of this analysis will be shown in the poster.

Affiliation

Kapteyn Astronomical Institute

Topic

Primary author: Ms PEIRANO BASTÍAS, Valentina (Kapteyn Astronomical Institute)

Presenter: Ms PEIRANO BASTÍAS, Valentina (Kapteyn Astronomical Institute)

Session Classification: POSTER SESSION

Contribution ID: **296** Type: **Solicited**

eROSITA on SRG

Thursday, September 12, 2019 5:15 PM (20 minutes)

The next generation of wide-area, sensitive X-ray surveys designed to map the hot and energetic Universe will be heralded by eROSITA (extended ROentgen Survey with an Imaging Telescope Array), the core instrument on the Russian-German Spektrum-Roentgen-Gamma (SRG) mission, successfully launched in July 2019. eROSITA will perform a deep survey of the entire X-ray sky, and will be about 30 times more sensitive than ROSAT in the soft energy band (0.5-2 keV), while in the hard band (2-10 keV) it will provide the first ever true imaging survey of the full sky. I will provide an overview of the science objectives of SRG/eROSITA, report on the status of the mission and highlight the next milestones in the scientific program of observations.

Affiliation

MPE

Topic

Primary author: Dr MERLONI, Andrea (Max Planck Institute for Extraterrestrial Physics)

Co-author: PREDEHL, Peter (MPE)

Presenter: Dr MERLONI, Andrea (Max Planck Institute for Extraterrestrial Physics)

Session Classification: FUTURE MISSIONS

Contribution ID: **298** Type: **Review**

Gravitational Waves

Primary author: Prof. SESANA, Alberto (Universita‘ di Milano Bicocca)

Presenter: Prof. SESANA, Alberto (Universita‘ di Milano Bicocca)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **299** Type: **Invited**

Gamma-ray bursts in the multi-messenger era

Monday, September 9, 2019 11:50 AM (25 minutes)

The discovery of the gravitational wave transient GW170817 and its electromagnetic counterparts ushered in a new era of multi-messenger. astrophysics, in which both gravitational waves and light provide complementary views of the same source. These observations gave astronomers the unprecedented opportunity to probe the merger of two neutron stars, solving decade-long mysteries about the origin of short duration gamma-ray bursts (GRBs) and the production of elements heavier than iron. In this talk, I will present the long-term evolution of GW170817 across the electromagnetic spectrum, and discuss its similarities with the sample of short GRBs at cosmological distances.

Topic

Affiliation

University of Maryland

Presenter: TROJA, Eleonora (University of Maryland)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **301** Type: **Review**

AGN demography and evolution

Primary author: Prof. ALEXANDER, David (Durham University)

Presenter: Prof. ALEXANDER, David (Durham University)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **302** Type: **Poster**

Multi-phase interplay in the jellyfish galaxy JW100

Friday, September 13, 2019 4:34 PM (2 minutes)

JW100 is a massive spiral galaxy infalling in the galaxy cluster Abell 2626. The extreme intracluster medium pressure is currently stripping the galaxy of its cold gas, producing the peculiar filaments typical of a jellyfish galaxy, where star formation is taking place. Interestingly, MUSE and Chandra observations revealed two odd characteristics of this galaxy. On the one hand, MUSE revealed an elongated, ionized tail of cold gas whose spectral properties can not be explained by star-formation only. On the other hand, Chandra detected a striking, diffuse X-ray emission that follows remarkably the stripped tail.
We performed an accurate study of the spectral properties of the X-ray emitting plasma, its correlation with cold galactic filaments and the interaction of the galaxy with the surrounding ICM. The emergent picture is that the interplay of cold ISM and hot ICM originated the X-ray emitting plasma that, in turn, may have played a role in the origin of the extended ionized structure. Therefore, JW100 represents an excellent laboratory to study the interaction between the different gas phases and its implications for star formation.

Affiliation

Dipartimento di Fisica e Astronomia UNIBO

Topic

Hot and diffuse baryons

Primary author: IGNESTI, Alessandro (Istituto Nazionale di Astrofisica (INAF))

Co-authors: Dr GITTI, Myriam (Universita di Bologna); POGGIANTI, Bianca Maria (Istituto Nazionale di Astrofisica (INAF)); Prof. BRIGHENTI, Fabrizio (DIFA Unibo)

Presenter: IGNESTI, Alessandro (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **303** Type: **Poster**

Detailed study of X-ray binary system M33 X-6 behaviour with XMM-Newton

Friday, September 13, 2019 3:34 PM (2 minutes)

We are looking for changes of spectral states of X-ray binary system X-6 in Galaxy M33 and similarities with other known Z-sources. In our previous work (Nikolaeva et al., 2018) we showed that there is a neutron star as a compact object. And spectrum shape looks like the spectrum in one of the spectral states of Z-source (neutron star with low magnetic field) RX J0042.6+4115 in M31 - the first extragalactic Z-source found, others have been found in our Galaxy. Using 28 datasets of XMM-Newton data, we fitted spectrum with different models which describes emission from corona, boundary layer, and thermal disk, found system period and plotted HID diagram.

Affiliation

Space Research Institute of Russian Academy of Sciences (IKI RAS)

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary authors: Ms NIKOLAEVA, Svetlana (Space Research Institute of Russian Academy of Sciences (IKI RAS)); Prof. SAZONOV, Sergey (Space Research Institute of Russian Academy of Sciences (IKI RAS)); Dr KRIVONOS, Roman (Space Research Institute of Russian Academy of Sciences (IKI RAS))

Presenter: Ms NIKOLAEVA, Svetlana (Space Research Institute of Russian Academy of Sciences (IKI RAS))

Session Classification: POSTER SESSION

Contribution ID: **304** Type: **Poster**

Effects of the Dust Scattering Halo of 1E 1740.7-2942 on it's timing properties during the hard state

Friday, September 13, 2019 4:10 PM (2 minutes)

We investigated the effects of dust scattering halo (DSH) of the high NH source (~10^23 cm^-2) 1E 1740.7-2942 on it's timing properties during the hard state. We observed the source simultaneously using XMM-Newton and RXTE for ~20 ks. Our results show that the observed fractional rms amplitude of variability is low compared to the typical values for the GBH sources in the hard state. Imaging analysis showed that the DSH is still present even in the EPIC-PN's "Small Window Mode". We also report that there is a molecular cloud with VLSR=-152.4 km . s-1 in the line-of-sight of the source. Finally, we employed an empirical correction method to obtain the "intrinsic" power spectra and rms amplitude of variability using XMM-Newton and RXTE data together.

Affiliation

Sabanci University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Mr TOYRAN, Ozan (Sabanci University)

Co-author: Prof. KALEMCI, Emrah (Sabanci University)

Presenter: Mr TOYRAN, Ozan (Sabanci University)

Session Classification: POSTER SESSION

Contribution ID: **305** Type: **Review**

From neutron stars to supermassive black holes: the gravitational wave view of compact binaries.

Monday, September 9, 2019 11:20 AM (30 minutes)

Recent gravitational wave (GW) detections with LIGO/Virgo opened a new window on the Universe, unveiling the most violent catastrophic events in the cosmos. GW astronomy is just in its infancy, 3G detectors will extend our capabilities to observe colliding black holes and neutron stars from the ground, and the Laser Interferometer Space Antenna (LISA) and Pulsar Timing Arrays (PTAs) will offer a complementary view of the GW universe in a much more extended range of frequencies, from mHz down to nHz, probing the whole mass spectrum of astrophysical black holes. After introducing the current successes of LIGO-Virgo, I will discuss the status and science objectives of 3G interferometers, LISA and PTA, their targeted sources and the multi-messenger science they will enable in the future decades.

Affiliation

Università di Milano Bicocca

Topic

Multi-messenger and transient astronomy

Primary author: Prof. SESANA, Alberto (Universita‘ di Milano Bicocca)

Presenter: Prof. SESANA, Alberto (Universita‘ di Milano Bicocca)

Session Classification: MULTI-MESSENGER AND TRANSIENT ASTRONOMY

Contribution ID: **306** Type: **Poster**

X-ray reverberation in AGN: towards an extended corona

Friday, September 13, 2019 5:10 PM (1 minute)

X-ray reverberation in Active Galactic Nuclei, believed to be the result of the reprocessing of coronal photons by the underlying accretion disc, has allowed us to probe the properties of the innermost regions of the accretion flow and the central black hole. Our current model (KYNREFREV) computes the time-dependent reflection spectra of the disc as a response to a flash of primary power-law radiation from a point source corona located on the axis of the black hole accretion disc (lamp-post geometry). Full relativistic effects are taken into account. The ionization of the disc is set for each radius according to the amount of the incident primary flux and the density of the accretion disc. We detect wavy residuals around the best-fit reverberation model time lags at high frequencies. This result suggests that the simple lamp-post geometry does not fully explain the X-ray source/disc configuration in Active Galactic Nuclei. There has been a noticeable progress into the development of codes for extended coronae (Wilkins+16, Chainakun & Young 2017, Taylor & Reynolds 2018a,b). Indeed, the model from Chainakun & Young (2017), consisting of two axial point sources illuminating an accretion disc that produce the reverberation lags is able to reproduce the observed time-lag versus frequency spectra.

Affiliation

Astronomical Institute of the Czech Academy of Sciences

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: CABALLERO-GARCIA, Maria D. (Astronomical Institute of the Czech Academy of Sciences (Prague))

Presenter: CABALLERO-GARCIA, Maria D. (Astronomical Institute of the Czech Academy of Sciences (Prague))

Session Classification: POSTER SESSION

Contribution ID: **307** Type: **Review**

Cosmic X-ray surveys of active galactic nuclei

Wednesday, September 11, 2019 4:20 PM (30 minutes)

I will review our understanding of the AGN as detected by the current suite of X-ray observatories. I will discuss the complementary parameter space from the broad swathe of extragalactic X-ray surveys undertaken to date. I will describe the types of AGN detected in these surveys, their overall properties and cosmic evolution. A key objective of this talk is to provide the context for many of the other talks in this session.

Affiliation

Durham University

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Prof. ALEXANDER, David (Durham University)

Presenter: Prof. ALEXANDER, David (Durham University)

Session Classification: ACTIVE GALACTIC NUCLEI

Contribution ID: **308** Type: **Invited**

Inter Galactic Medium at high spectral resolution

Wednesday, September 11, 2019 9:00 AM (25 minutes)

I will first review the baryon census in the local Universe and show that serious missing-mass problems are present at all scales. I will then present the possible solutions offered by hydro-dynamical simulations for the formation of structures, and show how theory reconciles these different-scale problems in the framework of a single missing-baryon problem. I will review the history of the hunt for the missing baryons over the past 20 years, and will present the most recent results both on the largest and smallest possible scales in the Universe. Finally, I will comment on the implications of these new results for future high resolution X-ray missions.

Affiliation

INAF - OAR

Topic

Hot and diffuse baryons

Primary author: NICASTRO, Fabrizio (Istituto Nazionale di Astrofisica (INAF))

Presenter: NICASTRO, Fabrizio (Istituto Nazionale di Astrofisica (INAF))

Session Classification: HOT AND DIFFUSE BARYONS

Contribution ID: **309** Type: **Poster**

Riccardo Giacconi: X-ray Pioneer: Explorer of the Secrets of the Hoary Deep

Friday, September 13, 2019 8:00 PM (2 minutes)

We summarize the contributions of Riccardo Giacconi starting from UHURU, through deep survey studies with the Einstein and ROSAT Observatories, to his exploration of the Chandra Deep Field South. In his earliest research with UHURU, Giacconi focussed on Galactic X-ray astronomy with studies of binary X-ray sources, especially Centaurus X-3 and Hercules X-1. With the dramatic increase in sensitivity provided by the Einstein Observatory, he probed the origin of the X-ray background which he continued with ROSAT and his collaborators at MPE. His X-ray studies culminated with the selection and imaging of the Chandra Deep Field South to resolve a large fraction of the X-ray background. We mention his unique contributions across the electromagnetic spectrum with his research and leadership including X-rays (UHURU, Einstein), optical (STScI, ESO), and radio (AUI/NRAO).

Affiliation

Harvard-Smithsonian Center for Astrophysics

Topic

Future missions

Primary authors: FORMAN, William (CfA-SAO); JONES, Christine (Harvard-Smithsonian Center for Astrophysics)

Presenter: FORMAN, William (CfA-SAO)

Session Classification: POSTER SESSION

Contribution ID: **310** Type: **Poster**

Merging in the Coma Cluster - Slingshot Tails and Runaway Shocks

Friday, September 13, 2019 4:32 PM (2 minutes)

We describe the merger of the NGC 4839 group with the Coma cluster using X-ray observations from the XMM-Newton and Chandra Obsservatories (Lyskova et al. 2019). X-ray data show two prominent features: (i) a long (600 kpc in projection), bent tail of cool gas trailing (towards the south-west) the optical center of NGC 4839, and ii) a 'sheath' region of enhanced X-ray surface brightness enveloping the group, which is due to hotter gas. We argue that a post-merger scenario provides a consistent explanation of the observed features. In this scenario a slingshot tail (Sheardown et al. 2019) is formed when the group, initially moving to the south-west, reverses its radial velocity after crossing the apocenter.bThe ram pressure ceases and the ram-pressure-displaced gas falls toward the center of the group (to the south west, away from the Coma cluster center) and overshoots the group center. Shortly after apocenter passage, the optical galaxy, dark matter and gaseous core are moving to the north-east, while the displaced gas continues moving to the south-west. In this scenario, the shock, driven by the group before reaching apocenter, has detached from the group and would be located close to the famous relic to the south-west of the Coma cluster. Such "runaway" shocks can survive in cluster outskirts where the density profile is sufficiently steep (Zhang et al. 2019).

Affiliation

Topic

Hot and diffuse baryons

Primary authors: FORMAN, William (CfA-SAO); Ms LYSKOVA, Natalia (Space Research Institute (IKI), Profsoyuznaya 84/32, Moscow 117997, Russia); ZHANG, C. (Max Planck Institut für Astrophysik); JONES, Christine (Harvard-Smithsonian Center for Astrophysics); ROEDIGER, E. (University of Hull); SHEARDOWN, A. (University of Hull)

Presenter: FORMAN, William (CfA-SAO)

Session Classification: POSTER SESSION

Contribution ID: **311** Type: **not specified**

Round table discussion

Friday, September 13, 2019 11:40 AM (1 hour)

Andrea Comastri, Chryssa Kouveliotou (chairs)

Pepi Fabbiano, Fabrizio Fiore, Poshak Gandhi, Colin Norman, Aurora Simoniescu

Affiliation

Topic

Session Classification: ROUND TABLE

Contribution ID: **312** Type: **not specified**

Raggi X dal Cosmo: l'Universo violento

E' piu' di un secolo che abbiamo scoperto questi misteriosi raggi capaci di penetrare il nostro corpo e di rivelare le nostra ossa.
I raggi X sono diventati indispensabili in campo medico, ma sono diventati altrettanto importanti per scoprire i fenomeni piu' energetici dell'Universo. E' con i raggi X che possiamo vedere la materia che cade in un buco nero, assistere in diretta allo scontro di due stelle di neutroni e vedere il gas caldo che pervade gli ammassi di galassie. E' una astronomia nuova, che racconta non la vita pacifica della stelle, ma i loro turbamenti, la loro morte e la loro rinascita sotto forma di buchi neri che piegano lo spazio, il tempo, e la nostra comprensione.

Presenter: GHISELLINI, Gabriele (INAF - OABrera)

Session Classification: CONCLUDING REMARKS - Martin Elvis

Contribution ID: **313** Type: **not specified**

Raggi X dal Cosmo: l'Universo violento

Friday, September 13, 2019 9:00 PM (2 hours)

E' piu' di un secolo che abbiamo scoperto questi misteriosi raggi capaci di penetrare il nostro corpo e di rivelare le nostra ossa. I raggi X sono diventati indispensabili in campo medico, ma sono diventati altrettanto importanti per scoprire i fenomeni piu' energetici dell'Universo. E' con i raggi X che possiamo vedere la materia che cade in un buco nero, assistere in diretta allo scontro di due stelle di neutroni e vedere il gas caldo che pervade gli ammassi di galassie. E' una astronomia nuova, che racconta non la vita pacifica delle stelle, ma i loro turbamenti, la loro morte e la loro rinascita sotto forma di buchi neri che piegano lo spazio, il tempo, e la nostra comprensione.

Affiliation

Topic

Presenter: GHISELLINI, Gabriele (INAF - OABrera)

Session Classification: CONFERENZA PUBBLICA (in Italian)

Contribution ID: **314** Type: **Poster**

X-ray properties of z>4 blazars

Friday, September 13, 2019 5:44 PM (2 minutes)

We present the X-ray properties of a complete and well-defined sample of 24 high-z (z=4-5.5) blazar candidates selected from the CLASS radio survey. After completing the existing archival data (Swift-XRT, Chandra and XMM-Newton) with dedicated Swift-XRT observations, we identified the bona-fide blazars based on the X-ray intensity (compared to the optical one) and flatness of the spectrum. We then compared their X-ray-to-radio luminosity ratios with a sample of confirmed blazars at lower redshifts (=1.1), finding a significant difference in the two populations. We interpret this redshift-dependant evolution as due to the interaction of the electrons within an extended part of the jet with the Cosmic Microwave Background photons.

Affiliation

Università degli Studi Milano-Bicocca

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: IGHINA, Luca (Dipartimento di Fisica Giuseppe Occhialini. Università degli Studi Milano Bicocca, Piazza dell'Ateneo Nuovo, 1, 20126 Milano, Italy)

Co-authors: CACCIANIGA, Alessandro (Istituto Nazionale di Astrofisica (INAF)); MORETTI, Alberto (Istituto Nazionale di Astrofisica (INAF)); BELLADITTA, Silvia (Istituto Nazionale di Astrofisica (INAF)); DELLA CECA, Roberto (Istituto Nazionale di Astrofisica (INAF)); BALLO, Lucia; DALLACASA, Daniele (Istituto Nazionale di Astrofisica (INAF))

Presenter: IGHINA, Luca (Dipartimento di Fisica Giuseppe Occhialini. Università degli Studi Milano Bicocca, Piazza dell'Ateneo Nuovo, 1, 20126 Milano, Italy)

Session Classification: POSTER SESSION

Contribution ID: **315** Type: **Solicited**

Athena: the Advanced Telescope for High Energy Astrophysics

Friday, September 13, 2019 9:00 AM (20 minutes)

Athena (The Advanced Telescope for High Energy Astrophysics) is a next-generation X-ray observatory to address the Hot and Energetic Universe science theme, selected by ESA as the second large mission of the Cosmic Vision program. The driving science of the mission is to understand the formation and evolution of hot gas structures in the Universe, and the growth and evolution of supermassive black holes. Athena consists of a single, large-aperture X-ray telescope based on Silicon Pore Optics (SPO) technology, which can be focussed onto one of two instruments. The X-ray Integral Field Unit (X-IFU), based on TES calorimeter technology, is a cryogenic instrument offering spatially resolved high resolution spectroscopy. The Wide Field Imager (WFI) features a large field of view with moderate resolution spectroscopy and high count rate capability, using Silicon DEPFET sensors. Athena is nearing the end of Phase A, with conceptual design work ongoing along with a vigorous technology development program. In this talk the science drivers of the mission will be briefly reviewed, along with the project status.

Affiliation

Max Planck Institute for Extraterrestrial Physics

Topic

Future missions

Primary author: NANDRA, Kirpal (MPE)

Presenter: NANDRA, Kirpal (MPE)

Session Classification: FUTURE MISSIONS

Contribution ID: **316** Type: **Poster**

A search for intermediate-mass black holes in the Swift-XRT catalog

Friday, September 13, 2019 4:12 PM (2 minutes)

Intermediate-mass black holes (IMBH) are thought to be the building blocks of supermassive black holes that are found at the center of massive galaxies, but evidence for their existence is elusive. We performed a search for IMBH in Swift-XRT data by studying hyperluminous X-ray source candidates (HLX), which were identified through a cross-correlation of the Swift-XRT catalog with the Galaxy List for the Advanced Detector Era (GLADE) covering nearly 2 million galaxies with high completeness up to 300Mpc. This selection contains foreground stars and background AGN that we partly eliminate by developing a classification into 3 classes (AGN, star and stellar-mass compact objects) based on the source properties. Thanks to this classification we are able to obtain 110 HLX candidates including 5 HLX previously identified in the literature. We are currently validating the nature of these objects.

Affiliation

Institut de Recherche en Astrophysique et Planétologie, Toulouse, France

Topic

Primary authors: TRANIN, Hugo (Institut de Recherche en Astrophysique et Planétologie, Toulouse, France); GODET, Olivier (Institut de Recherche en Astrophysique et Planétologie, Toulouse, France)

Presenter: TRANIN, Hugo (Institut de Recherche en Astrophysique et Planétologie, Toulouse, France)

Session Classification: POSTER SESSION

Contribution ID: **317** Type: **Poster**

Deep X-ray Spectral Imaging of the Bow-shock Nebula associated with PSR B1929+10

Friday, September 13, 2019 3:08 PM (1 minute)

We have studied the X-ray bow-shock nebula powered by the old non-recycled pulsar PSR B1929+10 with XMM-Newton data of an effective exposure ~310 ks, which provides the deepest investigation of this system so far. We found the X-ray tail has a length of ~8 arcmin, which is a factor of two longer than that reported in previous study. Evidence for spectral hardening along the tail has been found which suggests certain acceleration processes occur along the nebular emission. With multi-epoch data with a time span > 15 years, we have also placed constraints on the spatial and spectral variabilities of the nebula.

Affiliation

Chungnam National University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: KIM, Sang In (Chungnam National)

Co-author: Prof. HUI, Chung Yue (Department of Astronomy & Space Science, Chungnam National University, Daejeon, Korea (ROK))

Presenter: KIM, Sang In (Chungnam National)

Session Classification: POSTER SESSION

Contribution ID: **318** Type: **Poster**

X-ray Spectral Fitting of AGNs in XMM-COSMOS with a Bayesian Hierarchical Method

Friday, September 13, 2019 5:32 PM (2 minutes)

We present our results of fitting 663 X-ray spectra of AGN sources in the XMM-COSMOS field detected in 2-7 keV band, all of which have a spectroscopic redshift. We developed a new approach based on a Bayesian hierarchical model in order to correctly propagate on the main spectral parameters like Gamma and Nh the uncertainties due to the presence of additional, ill-constrained components like reflection and soft-excess, that are present in the X-ray spectra of AGN. Realistic simulations of AGN spectra have been created and analysed to validate our approach and identify the limitations in the recovery of the main parameters. Using the measured probability distributions and a Bayesian hierarchical model for the parent properties, we determine the distribution of the hydrogen column density as a function of redshift, and we study the dependence of the obscured AGN ratio on the source luminosity.

Affiliation

University of Geneva

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: Mr GE, Lingsong (University of Geneva)

Co-authors: Dr ECKERT, Dominique (University of Geneva); Prof. PALTANI, Stéphane (University of Geneva)

Presenter: Mr GE, Lingsong (University of Geneva)

Session Classification: POSTER SESSION

Contribution ID: **319** Type: **Poster**

The serendipitous source catalogue from overlapping XMM-Newton observations

Friday, September 13, 2019 6:52 PM (2 minutes)

20 years after its launch, XMM-Newton has performed more than 13,000 pointed observations which cover a total of more than 1,100 square degrees. The XMM-Newton Survey Science Centre consortium (SSC) generates serendipitous source catalogues from all public observations, which list positions and source parameters such as position, fluxes, hardness ratios, and extent. In 2018, we have published for the first time a catalogue from simultaneous source detection in a selection of 1,789 overlapping observations. It is based on a new standardised procedure for multiply observed sky areas and includes almost 72,000 sources. In addition to the standard parameters, it provides information on their inter-observation variability, derived directly from the simultaneous fit. The longer effective exposure time and the combined fit result in more faint detections, more precise determination of the source parameters, and likely lower spurious source content than for single observations.

This year, celebrating the anniversary, the SSC compiles new, fully reprocessed source catalogues. The next catalogue of sources in repeatedly observed sky areas is made from 1,340 stacks comprising about 7,500 individual observations with reasonably low background. Its sources are observed up to 65 times with a cumulated exposure time of about 1ks up to 2Ms.

Affiliation

Leibniz-Institut fuer Astrophysik Potsdam (AIP)

Topic

Primary author: TRAULSEN, Iris (Leibniz-Institut fuer Astrophysik Potsdam (AIP))

Co-authors: SCHWOPE, Axel (Leibniz-Institut fuer Astrophysik Potsdam (AIP)); LAMER, Georg (Leibniz-Institut fuer Astrophysik Potsdam (AIP)); ON BEHALF OF THE XMM-NEWTON SURVEY SCIENCE CENTRE CONSORTIUM

Presenter: TRAULSEN, Iris (Leibniz-Institut fuer Astrophysik Potsdam (AIP))

Session Classification: POSTER SESSION

Contribution ID: **320** Type: **Poster**

VERT-X: a new calibration facility for the ATHENA mirror assembly.

Friday, September 13, 2019 8:14 PM (2 minutes)

Calibration of the ATHENA telescope is a critical aspect of the project and raises significant difficulties due to the unprecedented size, mass and focal length of the mirror assembly. The VERT-X project, financed by ESA and started in January 2019 by a Consortium led by INAF and which includes EIE, Media Lario Technologies, GPAP, and BCV Progetti, aims to design an innovative calibration facility. The VERT-X concept is based on a beam expanded and paralleled by means of an inverted X-ray collimator which covers the entire ATHENA optics through a raster-scan mechanism put at short distance. This machinery allows a vertical and compact design with significant benefits with respect to traditional long-tube traditional facilities.

Affiliation

INAF (Italian National Institute for Astrophysics)

Topic

Future missions

Primary authors: MORETTI, Alberto (Istituto Nazionale di Astrofisica (INAF)); PARESCHI, Giovanni (INAF OAB); USLENGHI, Michela (Istituto Nazionale di Astrofisica (INAF)); LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF)); SALMASO, Bianca (Istituto Nazionale di Astrofisica (INAF)); Dr SIRONI, Giorgia (INAF Brera); BASSO, Stefano (Istituto Nazionale di Astrofisica (INAF)); TAGLIAFERRI, Gianpiero (Istituto Nazionale di Astrofisica (INAF)); FIORINI, Mauro (Istituto Nazionale di Astrofisica (INAF)); SPIGA, Daniele

Presenter: MORETTI, Alberto (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **321** Type: **Poster**

Monitoring a variable ULX in the Circinus Galaxy

Friday, September 13, 2019 3:43 PM (1 minute)

We present the results of an ongoing monitoring campaign of Circinus ULX5 using the Neil Gehrels *Swift* Observatory. The source shows significant variability, with clear high and low states, accompanied by variability in its spectral parameters. We discuss the physical mechanisms that may be responsible for the observed variability, including superorbital modulation due to a warped accretion disk and the "propeller effect" in which accretion is choked by the magnetic field of the accreting compact object. Further, we consider the implications of the observed variability in regards to the nature of the compact accretor, comparing our observations to those of known black hole and neutron star X-ray binaries.

Affiliation

Caltech

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: PIKE, Sean

Co-authors: Prof. HARRISON, Fiona; WALTON, Dominic (University of Cambridge); MURRAY, Brightman (Caltech)

Presenter: PIKE, Sean

Session Classification: POSTER SESSION

Contribution ID: **322** Type: **Poster**

Spin-Reversals in the X-ray Binary Pulsar OAO 1657-415

Friday, September 13, 2019 3:58 PM (2 minutes)

OAO 1657-415 is an X-ray binary pulsar that exhibited a long-term spin-up trend with short-term torque reversals in the past. In this work we present over 10 years of data from Fermi/GBM and Swift/BAT to study the long-term spin behavior and the torque-flux relation of this source, using current accretion torque models. The frequency history shows that the source is no longer on a spin-up trend but has settled in an equilibrium spin period of about 27 mHz with short-term spin-reversals. The analysis of the torque-flux relation shows a correlation when the source is spinning up, indicating that matter is likely accreted from a stable accretion disk. The observations during the spin-down of the pulsar could be explained by accretion from a retrograde disk or a sub-Keplarian behavior of the disk. The accretion process in this regime, however, remains elusive. A domain where the torque is close to zero has also been observed with a highly scattered flux, which could be explained by direct accretion from the stellar wind of the companion.

Affiliation

IAAT, University of Tuebingen

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Ms SAATHOFF, Inga (IAAT, University of Tuebingen)

Co-authors: Dr DUCCI, Lorenzo (IAAT, University of Tuebingen); Prof. SANTANGELO, Andrea (IAAT, University of Tuebingen)

Presenter: Ms SAATHOFF, Inga (IAAT, University of Tuebingen)

Session Classification: POSTER SESSION

Contribution ID: **323** Type: **Poster**

The Exceptional X-ray Evolution of SN 1996cr in High Resolution

Friday, September 13, 2019 2:04 PM (2 minutes)

We present X-ray spectra spanning 18 years of evolution for SN1996cr, one of the five nearest (~4 Mpc) SNe detected in the modern era. Chandra-HETG exposures allow us to resolve spectrally the velocity profiles of Ne, Mg, Si, S, and Fe emission lines and monitor their evolution as tracers of the ejecta-circumstellar medium (CSM) interaction. To explain the diversity of X-ray line profiles, we explore several possible geometrical models. Based on the highest S/N 2009 epoch, we find that a polar geometry with two distinct opening angle configurations and internal obscuration can successfully reproduce all of the observed line profiles. Furthermore, We extend this model to seven further epochs with lower S/N ratio and/or lower spectral-resolution between 2000-2018, yielding several interesting trends.

Affiliation

University of Chicago

Topic

Multi-messenger and transient astronomy

Primary authors: DWARKADAS, Vikram (University of Chicago); Mr QUIROLA, Jonathan (Pontificia Universidad Católica de Chile); Prof. BAUER, Franz (Pontificia Universidad Católica de Chile); Prof. BADENES, Carles (University of Pittsburgh); Prof. BRANDT, Niel (Penn State University); Dr NYMARK, Tanya; WALTON, Dominic (University of Cambridge)

Presenter: DWARKADAS, Vikram (University of Chicago)

Session Classification: POSTER SESSION

Contribution ID: **324** Type: **Poster**

Enhancing the ATHENA effective area at low x-ray energies with unconventional overcoatings

Friday, September 13, 2019 8:18 PM (2 minutes)

Low density overcoatings (mainly based on materials containing Carbon) onto usual hi Z materials (like Ir, Au or Pt) have been proposed more than 10 years ago for enhancing the X-ray reflectivity at low energy (between 0.5 and 4 keV) in X-ray astronomical optics. The hack is to use the total reflection from the low density material (which do not suffer much the photoelectric absorption) at low energy, while the photons at high energy are reflected by the high density material. Now for several future projects like e.g. ATHENA and eXTP it is foreseen the use of low density overcoatings that will importantly increase the effective area at low energy. In this poster we will discuss about the use of materials different from the ones considered so far, in particular based on a thin layer of Chromium followed by another layer of a Carbon-like material, and of novel approaches for their application.

Affiliation

INAF - Osservatorio Astronomico di Brera

Topic

Future missions

Primary author: PARESCHI, Giovanni (Istituto Nazionale di Astrofisica (INAF))

Co-authors: Dr PELLICIARI, Carlo (MPE); Dr GIBERTINI, Eugenio (Politecnico di Milano); Dr SIRONI, Giorgia (INAF- Osservatorio Astronomico di Brera); Dr VALSECCHI, Giuseppe (Media Lario srl); Prof. MAGAGNIN, Luca (Politecnico di Milano); Dr CIVITANI, Marta Maria (INAF - Osservatorio Astronomico di Brera); Dr BRADSHAW, Miranda (MPE); Dr DÖHRING, Thorsten (TH Aschaffenburg –University of Applied Sciences); Dr BURWITZ, Vadim (MPE); Dr COTRONEO, Vincenzo (INAF - Osservatorio Astronomico di Brera); Mr YANG, Yang (Tongji University / INAF - Osserv. Astron. Brera)

Presenter: PARESCHI, Giovanni (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **325** Type: **Poster**

A BCG with offset cooling: is the AGN feeding cycle broken in A2495?

Friday, September 13, 2019 4:46 PM (2 minutes)

We present a combined radio/X-ray analysis of the poorly studied galaxy cluster Abell 2495 (z=0.07923) based on new EVLA and Chandra data. We also analyze and discuss Hα emission and optical continuum data retrieved from the literature. We find an offset of ~ 6 kpc between the cluster BCG (MCG+02-58-021) and the peak of the X-ray emission, suggesting that the cooling process is not taking place on the central galaxy nucleus. We propose that sloshing of the ICM could be responsible for this separation. Furthermore, we detect a second, ~ 4 kpc offset between the peak of the Hα emission and that of the X-ray emission. Optical images highlight the presence of a dust filament extending up to ~ 6 kpc in the cluster BCG, and allow us to estimate a dust mass within the central 7 kpc of 1.7 ·10^5 M⊠. Exploiting the dust to gas ratio and the L_Hα-M_mol relation, we argue that a significant amount (up to 10^9 M⊠) of molecular gas should be present in the BCG of this cluster. We also investigate the presence of ICM depressions, finding two putative systems of cavities; the inner pair is characterized by t_age ~ 18 Myr and P_cav ~ 1.2 ·10^43 erg s−1, the outer one by t_age ~ 53 Myr and Pcav ~ 5.6 ·10^42 erg s−1. Their age difference appears to be consistent with the free-fall time of the central cooling gas and with the offset timescale estimated with the Hα kinematic data, suggesting that sloshing is likely playing a key role in this environment. Furthermore, the cavities' power analysis shows that the AGN energy injection is able to sustain the feedback cycle, despite cooling being offset from the BCG nucleus.

Affiliation

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Topic

Hot and diffuse baryons

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Session Classification: POSTER SESSION

Contribution ID: **326** Type: **Poster**

Data Mining and High Performance Computing in High-energy Astrophysics: the case of the Extragalactic X-ray pulsars.

Friday, September 13, 2019 3:56 PM (2 minutes)

The use of Big Data techniques and High Performance Computing (HPC) allows us to explore High-energy data archives in new ways, exploring and extracting new information buried in the fast growing volume of astrophysical data. I will talk about our mixed Data Mining and HPC approach and how it has allowed us to uncover a new population of Extragalactic Neutron Stars (NS), most of them - Ultra Luminous X-Ray sources (ULXs), a class believed to host intermediate-mass black holes. The discovery of these pulsating ULXs (PULXs), NS at strongly Super-Eddington luminosities, has change radically our views in the ULX population in general. I will describe these discoveries and their main implications and the future direction of our work in this field.

Affiliation

National Institute for Astrophysics - Rome Astronomical Observatory

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: RODRIGUEZ CASTILLO, Guillermo Andres (Istituto Nazionale di Astrofisica (INAF))

Co-author: ISRAEL, GianLuca (Istituto Nazionale di Astrofisica (INAF))

Presenter: RODRIGUEZ CASTILLO, Guillermo Andres (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **327** Type: **Poster**

Exploring the Diversity of Type 1 Active Galactic Nuclei Identified in SDSS-IV/SPIDERS

Friday, September 13, 2019 7:02 PM (2 minutes)

We present a statistical analysis of the optical properties of an X-ray selected Type 1 AGN sample using high signal-to-noise ratio (S/N>20) spectra of the counterparts of the ROSAT/2RX sources in the footprint of the SDSS-IV/SPIDERS (Spectroscopic IDentification of eROSITA Sources) programme. The sample of 2100 source is a factor of 4-18 larger than samples used in previous studies of this type. It significantly extends the probed redshift and luminosity ranges (z ~ 0.01 – 0.80 and $L_{0.1-2.4\,\mathrm{kev}}$ $1.9\times10^{41}-9.9\times10^{45}\mathrm{erg/s}$).

By means of a Principal Component Analysis, we derive Eigenvector (EV) 1 and 2 in an eleven dimensional optical and X-ray parameter space. The validity of the correlations of the Eddington ratio L/L_{Edd} with EV1 and the black hole mass with EV2 are strongly confirmed up to the redshift and luminosity ranges probed in this work.

Investigating the asymmetry of the broad Hβ lines, we show that the redshift of a very broad component, possibly stemming from the Very Broad Line Region, is a strong marker of diversity in our sample.

Furthermore, we report an intriguing difference in the relation between the equivalent width of the FeII emission and the continuum emission for the red- and blue-asymmetric Hβ emitting populations, and show that this contrasting behaviour is consistent with a flattened, stratified model of the Broad Line Region, in which the FeII emitting region is shielded from the central source.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Affiliation

Max-Planck-Insitut für extraterrestrische Physik

Primary authors: WOLF, Julien (Max Planck Institute for Extraterrestrial Physics); Dr SALVATO, Mara (MPE); Mr COFFEY, Damien (Max-Planck-Institut für extraterrestrische Physik); MERLONI, Andrea (Max Planck Institute for Extraterrestrial Physics); ARCODIA, Riccardo (Max-Planck-Institute for Extraterrestrial Physics); Mrs BARON, Dalya (School of Physics and Astronomy, Tel Aviv University); BUCHNER, Johannes (Max Planck Institute for Extraterrestrial Physics); CARRERA, Francisco J (Instituto de Fisica de Cantabria (CSIC-UC), Spain); Dr COMPARAT, Johan (Max-Planch-Institut für extraterrestrische Physik); Prof. SCHNEIDER, Donald P. (Department of Astronomy and Astrophysics, The Pennsylvania State Uniiversity); NANDRA, Kirpal (MPE)

Presenter: WOLF, Julien (Max Planck Institute for Extraterrestrial Physics)

Session Classification: POSTER SESSION

Contribution ID: **328** Type: **Poster**

Progress in timing properties of compact X-ray binaries by Sight-HXMT observation

Friday, September 13, 2019 3:52 PM (2 minutes)

The Hard X-ray Modulation Telescope (Insight-HXMT) is China's first astronomical satellite and launched on 15th June 2017. Thanks to its large effective area at high energy detector (up to 250 keV), some important achievements in X-ray binaries have been obtained. Here we only show a few interesting timing results: the high energy QPO up to 250 keV is discovered in black hole transient MAXI J1820+070, the kHz QPO in Sco X-1 extend to > 30keV, and so on. More and detail results can see the poster by Huang and the reports by S N Zhang and S Zhang in this conference.

Affiliation

Institute of High Energy Physics, Chinese Academy of Sciences

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: Dr QU, Jianlu (nstitute of High Energy Physics, Chinese Academy of Sciences)

Co-author: HUANG, Y. (Institute of High Energy Physics, Chinese Academy of Sciences)

Presenter: Dr QU, Jianlu (nstitute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: POSTER SESSION

Contribution ID: **329** Type: **Poster**

Accurate Solution of the Comptonization in X-ray Reflection Models

Friday, September 13, 2019 5:28 PM (2 minutes)

A large fraction of accreting black hole systems present clear evidence of the reprocessing of X-rays in the atmosphere of the accretion disk. The copious X-rays produced in the vicinity of a black hole illuminate the disk and produce a reflection spectrum which main hallmarks include fluorescent emission K-shell lines from iron (~6.4-6.9 keV), and a broad featureless component known as the "Compton hump" (~20-40 keV). The latter is produced by the scattering of high energy photons by the relatively colder electrons in the accretion disk, in combination with photo-electric absorption from iron. Until now, the treatment of this process in models of ionized X-ray reflection has been done in a very approximate manner using a Gaussian redistribution kernel. This approximation works sufficiently well up to ~100 keV, but it becomes largely inaccurate at higher energies and at relativistic temperatures. Here we report new calculations of X-ray reflection using a modified version of our model XILLVER, which now includes an accurate solution Compton scattering of the reflected photons in the disk atmosphere. This solution takes into account quantum electrodynamic and relativistic effects allowing the correct treatment of high photon energies and electron temperatures. We present new reflection spectra computed with this model, and discuss the improvements achieved in reproducing the correct shape of the Compton hump, as well as the effects of this new solution at softer energies.

Affiliation

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: GARCÍA, Javier (Caltech & Remeis Observatory)

Co-authors: SOKOLOVA-LAPA, Ekaterina; MADEJ, Jurek; ROZANSKA, Agata; HARRISON, Fiona; WILMS, Jörn

Presenter: GARCÍA, Javier (Caltech & Remeis Observatory)

Session Classification: POSTER SESSION

Contribution ID: **330** Type: **Poster**

Relativistic Reflection Signatures Detected from the Galactic Microquasar GRS 1758-258

Friday, September 13, 2019 3:54 PM (2 minutes)

GRS 1758-258 is a persistent X-ray source, located in the Galactic center, and considered to be an accreting stellar mass black hole on the basis of its hard X-ray emission and similarities to Cygnus X-1. The additional detection of relativistic jets from GRS 1758-258 is of great interest given the potential to test theoretical accretion in/outflow models. However, prior observations of GRS 1758-258 have revealed a simple power-law dominated hard X-ray spectrum. Herein, we present the results of a new 50 ks observation with NuSTAR. The source is detected across the broad NuSTAR bandpass and reveals, for the first time, the characteristic features of relativistic reflection from the inner accretion disk at a source luminosity of $\sim$ 1\% Eddington. Modeling the spectra with the relativistic reflection code relxill, we find the black hole to be rapidly rotating, with $a^* > 0.8$.

Affiliation

University of Michigan

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: REYNOLDS, Mark T. (University of Michigan)

Co-authors: MILLER , Jon M. (University of Michigan); CACKETT , Edward M. (Wayne State University)

Presenter: REYNOLDS, Mark T. (University of Michigan)

Session Classification: POSTER SESSION

Contribution ID: **331** Type: **Poster**

The 2017 Outburst of Swift J1357.2-0933: Variable period blue dips with a hot, dense HeII wind

Friday, September 13, 2019 3:41 PM (1 minute)

Quasi-simultaneous optical (ULTRACAM/NTT, SALT), X-ray (NuSTAR, XRT/Swift) and radio(ATCA) observations of the short P , high latitude LMXB transient, Swift J1357.2-0933 during its 2017 outburst have revealed remarkable additional properties. In addition to confirming the variable frequency optical dipping seen during its 2011 discovery outburst, we also find: (1) the dip shape is consistent with partial disc occultations, (2) the source becomes significantly bluer during these dips, indicating an unusual geometry compared to other LMXB dippers, (3) there is no X-ray response to the optical dips, (4) HeII and Balmer absorption is present only during the dips, and is blue-shifted by ~600 km s−1. These spectral features imply a very hot (Te ~40,000K), dense (n ~ 10^13−14cm−3) outflowing wind driven by a central LX ≥1036 erg s−1. Its periodic visibility implies a very high viewing inclination, and a warped inner disc structure that moves out during the outburst. This is also consistent with its low observed FX/Fopt ratio, implying that it is an Accretion Disc Corona (ADC) source, and not a VFXT (very faint X-ray transient).
This poster represents a summary of results presented in Paice et al 2019 (P19) and Charles et al 2019 (Ch19) - all figures are taken from these papers.

Affiliation

University of Southampton

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

Primary author: PAICE, John A. (University of Southampton)

Co-authors: CHARLES, Phil; GANDHI, Poshak; MATTHEWS, James; BUCKLEY, David; KOTZE, Enrico

Presenter: PAICE, John A. (University of Southampton)

Session Classification: POSTER SESSION

Contribution ID: **332** Type: **Poster**

X-ray imaging of relativistic shock in hotspots of Pictor A radio galaxy

Friday, September 13, 2019 6:54 PM (2 minutes)

Here we present some preliminary results of our analysis of the Chandra observations of the Western and Eastern hotspots in the Pictor A radio galaxy. All the available Chandra data for the target, consisting of multiple pointings spanning over 15 years and amounting to the total exposure time of 464ks, have been included in the analysis. In particular, with the image deconvolution method we studied the X-ray morphology and variability in the Western hotspot region, confirming the flux changes taking place in the source on the timescale of years,
and clearly resolving the bow-shock structure of the hotspot. For the Eastern hotspot, we performed a detailed spectral analysis of various regions selected based on the observed correlation between the X-ray intensity and the polarised radio intensity. All in all, our findings suggests a substantial substructure of the targeted relativistic shocks, and this has profound consequences for understanding acceleration of high-energy particles at relativistic shocks, as well as the pressure balance between magnetic field and ultra-relativistic electrons within the
extended lobes of radio galaxies

Affiliation

Astronomical Observatory, Jagiellonian University

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: THIMMAPPA, Rameshan (Astronomical Observatory, Jagiellonian University)

Co-authors: STAWARZ, Ł.; MARCHENKO, V.; BALASUBRAMANIAM , K.; PAJDOSZ, U.

Presenter: THIMMAPPA, Rameshan (Astronomical Observatory, Jagiellonian University)

Session Classification: POSTER SESSION

Contribution ID: **333** Type: **Poster**

Review of the particle background of the ATHENA X-IFU instrument

Friday, September 13, 2019 8:30 PM (2 minutes)

Athena is the second large-class X-ray mission of the European Space Agency Cosmic Vision, with a launch foreseen in 2031 towards an L2 halo orbit and dedicated to the study of the hot and energetic universe. X-ray observations are usually severely limited by the background, due to the intrinsic faintness of the astrophysical sources involved or to their diffuse nature. Here we are going to address the particle-induced background of the X-IFU instrument. Above 2-3 keV the background is dominated by two populations of charged particles: low energy particles that are funnelled by the mirrors into the focal plane, and high energy particles, that possess enough energy to travel through the spacecraft and reach the detector from any direction

Affiliation

INAF/IAPS Roma,

Topic

Future missions

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Presenter: LOTTI, Simone (Istituto Nazionale di Astrofisica (INAF))

Session Classification: POSTER SESSION

Contribution ID: **334** Type: **Poster**

X-rays from the youngest extragalactic radio jets

Friday, September 13, 2019 7:12 PM (2 minutes)

Formation and launching of relativistic jets is one manifestation of black hole activity. Jets impact the black hole surrounding and thus affect further black hole feeding and growth. This coupling is believed to be essential to the idea of AGN-galaxy feedback. Theory predicted that young radio jets should be strong high-energy emitters. However, they proved to be relatively faint and observing them has been challenging before the Chandra and XMM-Newton era. Here, we discuss the most recent results for a sample of Compact Symmetric Objects (CSO; radio structure sizes < 1 kpc) based on the new high quality spectral energy distributions including XMM-Newton, Chandra, NuSTAR and Fermi/LAT data. For the first time, we have now means to test theoretical scenarios for the high energy emission of the young radio jets (radio lobes origin, shocked ISM, jet, disk corona). We were able to refute the radio lobes origin in at least one source. In addition, we find evidence to support the dichotomy of the CSO environment that we have recently discovered. This dichotomy may suggest that X-ray obscured CSOs have smaller radio sizes than X-ray unobscured CSOs with the same radio power. Thus, the environment may play a crucial role in regulating the early growth of the radio jets. Importantly, X-rays emitted by the X-ray absorbed CSO subpopulation, in conjunction with the recent developments in the optical/IR and radio bands, offer new insights for understanding the structure and size of the AGN obscuring torus, as they provide information about the radiative processes and environment on the torus (parsec) scale. We discuss the implications of our results for the earliest stages of a radio galaxy evolution, high energy emission models of radio jets, diversity of the medium in which the jets expand, and jet-galaxy co-evolution.

Affiliation

CfA

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Primary author: SOBOLEWSKA, Malgosia (CfA)

Presenter: SOBOLEWSKA, Malgosia (CfA)

Session Classification: POSTER SESSION

Contribution ID: **335** Type: **Poster**

Multi-Epoch X-ray observations of globular cluster M62

Friday, September 13, 2019 4:26 PM (2 minutes)

The globular clusters (GCs) are dense stellar systems which can produce the compact binaries (e.g. cataclysmic variables (CVs), millisecond pulsars (MSPs), quiescent low-mass X-ray binary (qLMXBs)) through frequent dynamical interactions. M62 is among the GCs with the highest stellar encounter rate. In our analysis, we identify 43 X-ray sources within M62's half-light radius from two different observations with Chandra (0.3 - 7.0 keV) separated by ~12 years. Based on the distribution in the X-ray color-luminosity diagram and the variability analysis, 9 CV candidates and 4 qLMXBs candidates have been suggested. 2 MSP counterparts and 1 black hole (BH) candidate have been identified by the positional coincidence with the radio position. For all these compact binaries, we have also examined their spectral properties in details

Affiliation

Dept. of Astronomy and Space Science Chungnam National University

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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Presenter: OH, Kwangmin (Dept. of Astronomy and Space Science Chungnam National University)

Session Classification: POSTER SESSION