ASTRO@TS 2015

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Cosmology with Galaxies and the CMB

Emanuele Castorina (SISSA)

Cosmology with Large Scale Structures: from dark matter to halos and galaxies

In this talk I will review some recent developments in the theoretical modelling for the non linear clustering of dark matter, and its relation to descrete tracers such as halos galaxies and voids, describing one-, two- and three- point statistics of these objects.

Francesco Paci (SISSA)

Cosmology with the CMB

The base LCDM model is strongly supported by observations. I will review the main Planck 2015 temperature and polarization results, and discuss their implications for cosmology. I will also briefly report on the recent polarization results obtained by ground-based CMB experiments.

Elena Massara (SISSA)

Modelling the Large Scale Structure in massive neutrino cosmologies

Neutrino oscillation experiments have shown that at least two of the three neutrino species are massive and massive neutrinos impact on the evolution of structures in the Universe, at the linear and non-linear levels. Firstly, I will discuss how to model the non-linear matter power spectrum in a massive neutrino cosmology, using an extended version of the halo model. I will show a comparison between these theoretical predictions and the results of N-body simulations that incorporate massive neutrinos. Secondly, I will present a study of the properties of voids found in our simulations, focusing on how these properties are affected by the presence of massive neutrinos.

Jingjing Shi (SISSA)

Flow Patterns around Dark Matter Halos: the Link between Halo Dynamical Properties and Large Scale Tidal Field

We study how halo intrinsic dynamical properties are linked to their formation processes for halos in two mass ranges, $10^{12} - 10^{12.5}\ h^{-1}\,M_\odot$ and $\geq 10^{13}\ h^{-1}\,M_\odot$, and how both are correlated with the large scale tidal field within which the halos reside at present. Halo merger trees obtained from cosmological N-body simulations are used to identify infall halos that are about to merge with their hosts. We find that the tangential component of the infall velocity increases significantly with the strength of the local tidal field, but no strong correlation is found for the radial component. These results can be used to explain how the internal velocity anisotropy and spin of halos depend on environment. The position vectors and velocities of infall halos are aligned with the principal axes of the local tidal field, and the alignment depends on the strength of the tidal field. Opposite accretion patterns are found in weak and strong tidal fields, in the sense that in a weak field the accretion flow is dominated by radial motion within the local structure, while a large tangential component is present in a strong field. These findings can be used to understand the strong alignments we find between the principal axes of the internal velocity ellipsoids of halos and the local tidal field, and their dependence on the strength of tidal field. They also explain why halo spin increases with the strength of local tidal field, but only in weak tidal fields does the spin-tidal field alignment follow the prediction of the tidal torque theory. We discuss how our results may be used to understand the spins of disk galaxies and velocity structures of elliptical galaxies and their correlations with large-scale structure.

Federico Bianchini (SISSA)

Cross-correlation in the high-redshift sky: the Planck and Herschel case

High-resolution Cosmic Microwave Background (CMB) measurements carried out both by space- and ground-based experiments enables us to reconstruct the CMB Lensing map, which probes the matter distribution in the Universe out to high redshifts, hence encoding a wealth of cosmological information. On the other side, dusty star-forming galaxies (DSFG) at $z > 1.5$ are the biased signposts of the haloes

that act as lenses for CMB photons.
I will present the first cross-correlation analysis between CMB Lensing measured by Planck and the spatial distribution of the sub-mm selected high-z H-ATLAS galaxies, describing both datasets and technique exploited. The signal is detected with high significance even when analysis is performed on redshift bins.
I will show constraints on galaxy bias inferred from jointly clustering and cross-correlation data, discussing possible systematics and future work needed in order to fully exploit upcoming CMB and galaxy surveys.

Vid Irsic (ICTP)
Large-scale effects of the Lyman-alpha forest
In the light of recent observational advances of measurements of the 3D Lyman alpha flux correlations, it seems necessary to consider the large-scale effects on the forest statistics. In particular, we investigate the effetcs of the full general relativistic treatment which I'll present in this talk. I'll also comment on some possible astrophysical and cosmological signals, which might affect the large-scale flux power.

Chemical Evolution and Stars
Fiorenzo Vincenzo (UniTs)
Chemical evolution of galaxies: state of the art
In the first part of my talk, I will shortly introduce the research topic of our group, which is the study of the chemical evolution of galaxies, and the methods, which we employ to pursue our scientific aims. In particular, the main purpose of our study is to understand how different types of galaxies have evolved, by reconstructing – going back in time – the chemical enrichment history of their interstellar medium, starting from the chemical abundances derived today in the atmospheres of their stars. In the second part, I will give some hints about our recent progresses in the study of the Milky Way and dwarf spheroidal galaxies of the Local Group.

Xiaoting Fu (SISSA)
Lithium evolution in metal-poor stars: from Pre-Main Sequence to the Spite plateau
Lithium abundance derived in metal-poor main sequence stars is about three times lower than the value of primordial Li predicted by the standard Big Bang nucleosynthesis when the baryon density is taken from the CMB or the deuterium measurements.
This disagreement is generally referred as the lithium problem. We here reconsider the stellar Li evolution from the pre-main sequence to the end of the main sequence phase by introducing the effects of convective overshooting and residual mass accretion. We show that 7 Li could be significantly depleted by convective overshooting in the premain sequence phase and then partially restored in the stellar atmosphere by a tail of matter accretion which follows the Li depletion phase and that could be regulated by EUV photo-evaporation. By considering the conventional nuclear burning and microscopic diffusion along the main sequence we can reproduce the Spite plateau for stars with initial mass m 0 = 0.62 − 0.80 M ⊙ , and the Li declining branch for lower mass dwarfs, e.g, m 0 = 0.57 − 0.60 M ⊙ , for a wide range of metallicities (Z=0.00001 to Z=0.0005), starting from an initial Li abundance A(Li) = 2.72. This environmental Li evolution model also offers the possibility to interpret the decrease of Li abundance in extremely metal-poor stars, the Li disparities in spectroscopic binaries and the low Li abundance in planet hosting stars.

Emaneuele Spitoni (UniTs)
The effects of stellar migration and environment on chemical evolution models
In the last years, stellar migration in galactic discs has been the subject of several investigations. However, its impact on the chemical evolution of the Milky Way still needs to be fully quantified. Here, we aim at imposing some constraints on the significance of this phenomenon by considering its influence on the chemical evolution of the Milky Way thin disc. When stellar migration is implemented according to the results of chemo-dynamical simulations and finite stellar velocities of

1 km/s are taken into account, the high-metallicity tail of the metallicity distribution function of long-lived, thin-disk stars is well reproduced. In the second part of the talk I will present new chemical evolution analytical solutions including environment effects taking into account galaxy-galaxy interactions, primordial infall, and galactic fountains.

Alessandro Trani (SISSA)
Kozai-induced precession in the Galactic Centre
The Galactic Centre is a crowded environment: observations revealed the presence of (molecular, atomic and ionised) gas, a cusp of late-type stars and a number of early-type stars, ~20% of which lie in a disc. Several scenarios have been proposed to explain the formation of the stellar disc, none of which accounts for the stars not lying in the disc. A possible scenario is that the outliers are former members of the outer parts of the disc, dismembered by Kozai-induced precession in an axisymmetric potential. We show with N-body and SPH simulations that source of axisymmetric potential can be the circumnuclear ring, a molecular torus observed at ~2 pc from SgrA*.

Ikechukwu Anthony Obi (SISSA)
Thermal and non-thermal radio emission in young star forming metal poor galaxies
By means of the new PARSEC database of evolutionary tracks of massive stars, we compute the ionizing photon budget, the integrated light and the supernova rates predicted by young simple stellar population models. Using these quantities in GRASIL we predict on one side the thermal and non-thermal radio emission and on the other, the mid and far infrared emission, and compare the models with star forming galaxies. We focus on local metal poor galaxies with the aim of calibrating IR and radio SFR indicators for very young galaxies at high redshifts.

Giovanni Vladilo (OATs)
Planetary habitability
Current statistics of exoplanets suggest that the number of terrestrial planets yet to be discovered is quite large. However, Earth-sized planets are difficult to characterize with observations, and the study of their habitability requires a large effort of modelization aimed at exploring the space of unknown planetary parameters. In this presentation, I will briefly report an ongoing project aimed at exploring the habitability of terrestrial planets by means of a set of specifically designed climate tools. Some examples of applications will be shown. The project is part of the astrobiological investigations carried out at INAF-OATs that I will briefly summarize. One of the goals of these investigations is to provide operational definitions of planetary and Galactic habitability.

Dark Matter
Ekaterina Karukes (SISSA)
Dark Matter density distribution in galaxies
We use a large number of recent very extended HI rotation curves of spiral galaxies in order to derive theirdistribution od dark matter (DM) at large radii, well beyond the stellar disk, in the context of suitable local density method developed by Salucci et al 2010. We find that the derived DM halo profiles are in tension with the LCDM profile. This result becomes a problem independent and more serious than the cusp-core issue.

Mauro Valli (SISSA)
On the robustness of Dark Matter limits from dwarf spheroidal galaxies
We review moment-based methods to model pressure-supported approximately spherical systems like dwarf spheroidal (dSph) galaxies, reassessing the so called “mass- anisotropy degeneracy problem”. We propose a novel approach to address it properly, based on the analytical inversion of the spherical Jeans equation. The raison d’être of the work is then to present a semi-analytical approach to derive reliable constraints on the line-of-sight integral of dSph halo densities.
Remarkably, we find the tough upper-bounds given at present on the velocity averaged cross-section of thermal relics to be quite robust against the main unknown of the modelling, i.e. the tracer orbital anisotropy profile.

Giorgio Busoni (SISSA)
Review of Dark Matter searches and EFT validity at LHC
Searching for DM is one of the main aims for Astro-particle physicists nowadays. I start with a brief review of the different kinds of DM experimental searches, then I focus on collider searches discussing limits of validity of EFT at Large Hadron Collider.

Isabella Paola Carucci (SISSA)
The imprint of warm dark matter on the 21cm power spectrum: forecasts for SKA
The LCDM model experiences small-scale problems that could be solved by allowing dark matter to have intrinsic thermal velocities, i.e. warm dark matter (WDM). We discuss the impact of WDM on the 21cm power spectrum, which will be probed by the future Square Kilometre array (SKA). We present a series of high-resolution hydrodynamical N-body simulations with different dark matter models (CDM or WDM), we study the spatial distribution of the neutral hydrogen (HI) at redshifts z from 3 to 5 in the post-reionization era. We then investigate the features induced by WDM on the 21cm power spectrum and forecast the bounds that the future SKA1-LOW instrument will place on its mass.

General Relativity
Arif Mohd (SISSA)
Emergent gravity

Alessio Belenchia (SISSA)
Causal-set's non locality
I will give a brief introduction to Causal-set theory focusing in particular on the non-locality arising in this theory. In particular I will show how a non-local wave operator can be constructed and what are its drawbacks and possible phenomenological consequences.

Enea Di Dio (OATs)
Relativistic effects on galaxy clustering
Future surveys will cover a large fraction of the sky up to high redshift. They will offer us the opportunity to test the theory of gravity at the horizon scale, where newtonian gravity is expected to fail and a relativistic description is needed.
In my talk I will show the relativistic effects on galaxy clustering observables up to second order.

Marco Raveri (SISSA) *Observational implications of the Effective Field Theory approach to dark energy and modified gravity*
In this talk I'll discuss the relevance of the Effective Field Theory (EFT) approach in testing modified gravity and dark energy models that aim at solving the problem of cosmic acceleration. In particular I'll briefly review the EFT construction and its implementation into the Einstein-Boltzmann solver EFTCAMB that is publicly available and can be used to test a wide range of models against cosmological observations. I'll then show the constraints on such models that have been recently obtained using this software by our group and by the Planck collaboration.

Future Observations
Erik Romelli (UniTs)
End-to_End simulations for Euclid: redshift and persistence
My research project is focused on end-to-end simulations for the Euclid mission. The main idea is to design and implement a complete end-to-end simulator to assess the performance of the on-board instrumentation, starting from the definition of a survey strategy to the on-ground calibration and data processing. The implementation phase started with the implementation of a prototype. The goal of the prototype is to assess the performance of the NISP instrument and is focused on redshift measurement. ESA wants to investigate if persistence is a main issue also in spectroscopy for Euclid. The idea is to use this prototype to perform a first persistence test on NISP. In my talk I am going to briefly describe the different modules composing the simulator underlying the main issues of the work.

Daniele Tavagnacco (UniTs)
Observing the sky from the South Pole
Antarctica is one of the best places on Earth where to observe the sky at infrared wavelengths. Due to the extreme environmental conditions, the operations with the instruments in Antarctica are very similar to space missions. I will describe the challenges and the results obtained during the 2014 winterover campain on the IRAIT/ITM infrared telescope located in Concordia Base, Dome C, Antarctica.

Guido Cupani (OATs)
The age of precision spectroscopy: from ESPRESSO@VLT to HIRES@E-ELT
A leap in the capability of optical spectrographs is pushed by several ambitious science cases in observational cosmology. In principle, the use of quasars as background sources may help constrain the variability of fundamental constants at an unprecedented level, and it may even allow to directly observe the accelerated expansion of the Universe, provided that excellent stability and wavelength accuracy are maintained for extended periods of time. In this talk I will describe how the new spectrograph ESPRESSO and its Data Analysis Software will explore the field of precision cosmology with quasar spectra, and pave the way towards the next generation of extremely-large-telescope instruments.

Sergio Fabiani (INFN)
The LOFT mission
LOFT (Large Observatory For X-ray Timing) is a proposed space mission to the 4th ESA call for a medium class mission intended to answer fundamental questions about the motion of matter orbiting close to the event horizon of a black hole, and the state of matter in neutron stars.
High-time-resolution X-ray observations of compact objects (as the Galactic and extraGalactic neutron stars and black holes) provide a unique tool to investigate strong-field gravity, and give direct access to measurements of black hole masses and spins, and to the equation of state of ultradense matter. The fundamental bricks of LOFT instrumentation are the Silicon Drift Detectors (SDDs) developed at INFN-Ts in collaboration with FBK.

Galaxy Formation and Inter-Galactic Medium
Fabio Fontanot (OATs)
A theoretical perspective on the problem of galaxy evolution
In my talk I will review the key physical mechanisms responsible for the formation and evolution of galaxies and I will discuss their relative importance in shaping the statistical properties of galaxy populations. I will give an overview of the main theoretical tools used in the field, i.e. numerical simulations and semi-analytic models, and critically compare their predictions with a number of observational data, focusing on the role played by stellar and AGN feedbacks and galaxy mergers to regulate the distribution of baryons in the Universe. I will finally briefly discuss how galaxy mock catalogues can be effectively used to constrain modified Dark Energy cosmologies, alternative to the standard - cosmological constant - model.

Isabelle Pâris (OATs)
The power of quasar absorption lines to reveal the dark side of the Universe
The study of quasar absorption lines provides a powerful tool to probe the physics of the intergalactic medium (IGM) but also the physical properties of gas located in the environment of quasars and galaxies. First, I will describe the observation of quasar absorption lines and the physical information one can retrieve. Then, I will give a brief overview of the current understanding of the IGM, its thermal history, its structure and the constraints it provides on cosmology. Finally, I will show how one can probe quasar outflows by the means of the quasar absorption line technique and their link with the quasar feedback mechanism.

Claudia Mancuso (SISSA)

Radio emission to trace the star formation rate with SKA

We investigate how the continuum radio emission can trace the star formation history of the Universe. To do that we use the SFR-synchrotron and SFR-free-free emission relations from the literature. We applied a scatter of 0.4, and checked the match of the luminosity function produced with the Local Luminosity function at 1.4 GHz for the synchrotron-SFR relation. The SFR functions used to model the radio emission are built with a collection of IR (Herschel and Spitzer) and UV (HST) data, and are well reproduced by a physical model for proto-spheroidal galaxies (dominant at z>1.5), and rendered by a phenomenological approach for the late-type galaxies (dominant at z<1.5). The reliability of the radio-SFR relations has been tested against the 1.4 GHz number counts for the synchrotron emission, and the SED of dusty star forming galaxies from the SPT survey by Mocanu et al.2013 for the free-free emission.

We produced detailed predictions for the continuum surveys expected for the SKA and its precursors, both the number counts of star forming galaxies at 1.4 GHz. We also produced the corresponding redshift distributions, considering, in addition to the proto-spheroidals and late-type galaxies, also the population of strongly lensed proto-spheroidals. We also tested the improvement in detecting SFRs with respect to Herschel, the best IR instrument on disposal.

We finally explored the synergies between the SKA and the upcoming facilities for recoiling the redshifts of galaxies, as the LSST, the JWST, Euclid and the Hyper-suprime cam on SUBARU.

Rossella Aversa (SISSA)

Black hole and galaxy co-evolution

We investigate the coevolution of black holes and hosting galaxies throughout the history of the Universe by a statistical approach based on the continuity equation and the abundance matching technique. We present analytical solutions of the continuity equation to reconstruct both the supermassive black hole and stellar mass functions from the observed AGN and star formation luminosity functions, along with Eddington ratio distributions and duty cycles as a function on mass and redshift. In addition, we develop an improved abundance matching technique to link the stellar and BH content of galaxies to the dark matter component. The resulting relationships highlight the complementary role of stellar and AGN feedback in the star formation process, and we used them to investigate the galaxy and AGN clustering as a function of redshift, mass and luminosity.

Paramita Barai (OATs)

Gas outflows in cosmological hydrodynamical simulations

I will present results from cosmological hydrodynamical simulations performed using novel baryonic feedback models, and analysis of gas flows in simulated galaxies/IGM (Barai et al. 2015). We measure and quantify properties of galactic outflows: velocity, mass flow rate, mass loading factor; and derive correlations with galaxy properties (halo mass, stellar mass, star-formation rate, etc). Our simulated properties are overall consistent with observations.

Chiara Mongardi (UniTs)

IGM with hydrodynamical simulations

The main goal of my PhD project is to explore and characterize the properties of the intergalactic medium around galaxies in the low and high-redshift Universe, in order to shed light on the life-cycle of gas and the processes of feedback and metal enrichment, using hydrodynamical simulations. I will give a brief overview on how we can extract gas physical quantities from numerical simulations and I will introduce the work I am doing regarding study of CIV absorption lines at z=2. As CIV absorption lines have been observed associated to HI column densities typical of the Lya-forest, which probes low-density environments, the main question we would like to answer is what caused the metal enrichment of the IGM and where exactly the metal-enriched gas is located.

Lizhi Xie (OATs)

Implementing H2-based star formation laws in semi-analytic galaxy formation model

We implement physical motivated star formation recipes which relate star formation rate to the abundance of molecular hydrogen into our most updated semi-analytic galaxy formation model. We

keep the other physical recipes unchanged to study the effect of new star formation laws on globular star formation history, stellar mass function, cold gas mass function, and metallicity-stellarmass relation etc. We used two theoretical models to participate cold gas into neutral hydrogen molecular hydrogen. We aim to produce full sky HI map as well as HI surface profile of individual galaxies, which will be predictions of future HI surveys.

Serena Perrotta (SISSA)
Occurrence and global properties of narrow associated absorption lines in the XQ-100 Legacy Survey
We present a sample of narrow absorption lines (NALs) systems detected in the spectra of 100 quasars (QSOs) with z>3.5. Our analysis is based on intermediate resolution and large spectral coverage X-Shooter observations collected in the XQ-100 Legacy Survey. We take advantage of the X-Shooter data to measure with higher precision the systemic redshifts of the considered QSOs thanks to the large number of emission lines and the extension in the near-IR. These QSOs were originally selected without regard to NAL features, so these data allow us to build a large and unbiased sample. We carry out a statistical study of NAL physical properties with the following primary goals: 1) discriminate between associated NALs (velocity |v| < 5000 km/s) and NALs produced in cosmologically intervening structures; 2) compare them with the characteristics of their host galaxy.

High Energy Astrophysics
Francesco Longo (UniTs/INFN)
High-energy astrophysics with cosmic rays and high-energy gamma rays
Complementary information about physical processes in high energy sources as well as searches for signatures of new physics can be obtained by means of cosmic-ray and gamma-ray observations. A brief review of the main results of the current experiments will be presented. The future of such observations with planned new missions will be also outlined.

Rachele Desiante (UniUd/INFN)
Solar Flares observations with Fermi experiment
During its first 7 years of operation the Fermi Large Area Telescope (LAT) observed gamma-ray emission (>30 MeV) from about 40 solar flares. LAT detections are associated both with the impulsive and the temporally extended phase of solar flares, suggesting that particle acceleration up to very high energies in solar flares is more common than previously thought and can last for several hours after the impulsive phase. Here, I present an overview of LAT solar flare detections, including the first two observations of behind-the-limb flares, and I'll briefly show some interesting improvements that are now achievable using the new Pass 8 data sets.

Alessio Berti (UniTs/INFN)
Search for high-energy emission from GRB with MAGIC experiment
Gamma-ray Bursts (GRBs) are the most violent explosions in the Universe, releasing a huge amount of energy in few seconds. From their discovery, many satellite-based instruments were developed in order to understand how their emission works. While our understanding of the prompt and the afterglow has increased with BATSE, Swift and Fermi, we have very few information about their High Energy (HE, E . 100 GeV) and Very High Energy (VHE, E & 100 GeV) emission. This requires a ground-based experiment capable of fast follow-up after alerts from satellites and an energy threshold low enough to detect HE rays. MAGIC (Major Atmospheric Gamma-ray Imaging Cherenkov) was designed from the start to be able to follow-up GRBs with its fast slewing movement and low energy threshold (25 GeV with the sum trigger). Since it is operative, MAGIC followed-up almost one hundred GRBs but only a small fraction of them has redshift information available from space detectors. In this talk the GCN alert system, the MAGIC GRBs follow-up campaign and the constraints we can put by detecting HE and VHE rays from GRBs will be reviewed.

Riccardo Munini (UniTs/INFN)
Solar modulation of galactic cosmic rays with the PAMELA experiment

The satellite-borne PAMELA experiment has been continuously collecting datasince 15th June 2006, when it was launched from the Baikonur cosmodrome to detect the charged component of cosmic rays over a wide energy range and with unprecedented statistics. The apparatus design is particularly suited for particle and antiparticle identification. The PAMELA experiment has measured the time dependent electron and proton spectra at Earth in great detail, extending up to about 100 GeV and down to about 70 MeV. The yearly average galactic cosmic ray electron and proton spectra from June 2006 to January 2009, i.e. measured during the solar minimum of solar cycle 23, are presented. These fluxes provide important information for the study of the charge particles propagation inside the heliosphere.

Marin Karuza (INFN/Univ. of Rijeka)
Experiments beyond the Standard Model
Dark energy and dark matter are two of the greatest cosmic puzzles. Together they make more than 90% of the energy budget of the universe and still their nature and origin remain a complete mystery. While the candidates for the dark energy include Einstein's cosmological constant and a "quintessence scalar field" the candidates for the dark energy are only a bit less exotic and they include relic axions and WIMPS. The experimental efforts are focused mainly on the detection of WIMPs in either underground laboratories or space missions while the search for chameleons and relic axions is limited and in some aspects only at the beginning. Novel approaches and ideas are necessary for their successful detection and some of them will be presented in this talk.

Saeede Nafooshe (Univ. of Nova Gorica)
Black Hole story
The question of the final fate of black holes has been raised since Hawking suggested that black holes will emit quantum thermal radiation and by this process they will lose their mass. This process is also known as black hole evaporation. In this talk I will review two aspects of black hole evaporation: the grey-body factors and the final fate of a black hole.

Galaxy Clusters
Elena Rasia (OATs)
Observational analysis of simulated clusters of galaxies
Investigating cluster properties is crucial to validate our knowledge of the fundamental physical processes regulating the formation and evolution of cosmic structures and the interaction between constituents of the universe. In vision of future large cosmological cluster-based surveys, I will review our effort to establish a robust theoretical framework to be used for the interpretation of the large amount of data we will receive from the sky. I will particularly stress on the importance of accurate mass estimates.

Barbara Sartoris (UniTs)
Galaxy clusters: the crossroads between cosmology and astrophysics
Galaxy clusters are at the crossroads between cosmology and astrophysics. Their distribution (i.e. correlation function and power spectrum) and their number density redshift evolution are very sensitive to both the underlying geometry of the Universe and the growth of structure on large scales. Thus they are used to constrain parameters that describe the cosmological models and to distinguish among different models.
In view of future large surveys to be carried out with the next generation of telescopes (i.e. Euclid), I will review how in our group we quantify the constraining power of such surveys and we understand the possible limiting factors in their cosmological exploitation. In order to use clusters as cosmological probe, it is crucial to determine the cluster mass from observational quantities and to study the astrophysics of the clusters. In this prospect I will summarize the results of our group in the determination of the mass profile from the galaxy dynamics, in the study of the substructures, and of the evolution of the cluster galaxy populations. These astrophysical studies have been carried out within the CLASH-VLT project (P.I. P. Rosati); I will summarize the the characteristics and the aim of the CLASH -VLT program, and the role played by our group in it.

Eleonora Biffi (UniTs)

Hydro-simulations of galaxy clusters: ICM properties

I will present the focus of my research on galaxy cluster physics, by means of cosmological hydrodynamical simulations. In particular, I will describe the expectations on the thermo-dynamical properties of the diffuse baryonic component in clusters (ICM), which depend not only on the numerical treatment of the ongoing physical processes, but also on the reconstruction process of their observable signatures.

Marianna Annunziatella (UniTs)

The evolution of galaxies in clusters at intermediate redshift. How environmental processes affect the galaxy stellar mass function

In this talk, I will summarize the results of my PhD project. The aim of my work is to constrain the mechanisms which drive the evolution of galaxies in clusters. To do this I use the data from CLASH-VLT survey, which collects data for clusters in the redshift range 0.2-0.6. I will focus on the study of the stellar mass function (SMF) of passive and star-forming (SF) galaxies in different regions of two clusters in the CLASH-VLT sample, Abell 209 (A209) and MACS J1206.2-0847 (M1206), at z=0.21 and 0.44, respectively. The comparison between the results obtained for these two clusters can inform us about the evolution of the SMF with cosmic time.

Samuel Farrens (OATs)

A 480s breakdown of clusters in the context of Euclid

In this talk I will provide an eight minute summary of some of the work that is currently being done with regards to clusters of galaxies within the Euclid consortium. I will also strive to provide a clear and concise picture of what the overall objectives of this work are and how they tie in with project as a whole.