SOXS AGN Working Group 9

Marco Landoni - INAF National Institute of Astrophysics on behalf of the AGN WG 9

Overview

Based on the work done by the WG members in the document
https://docs.google.com/document/d/1Dbj4jG3iGoT4sl4whjP4BJQx_TO0rmC29-IihoSYNYo/edit

Our team

Name(s)	Surname	Institute
Marco	Landoni	INAF-OAB
Silvia	Piranomonte	INAF-OAR
Roberto	Della Ceca	INAF-OAB
Paola	Severgnini	INAF-OAB
Roberto	Serafinelli	INAF-OAB
Alberto	Moretti	INAF-OAB
Franz	Bauer	PUC/MAS
Suvendu	Rakshit	FINCA/UTU
Marco	Berton	FINCA/UTU
Rubina	Kotak	UTU
Simona	Paiano	INAF-OAPd
Seppo	Mattila	UTU
Alessandro	Caccianiga	INAF-OAB
Jari	Kotilainen	FINCA/UTU
Roberto	De Propris	FINCA/UTU
Paola	Marziani	INAF-OAPd
Johan	Fynbo	Neils Bohr Inst.
Demetra	Decicco	PUC/MAC
Valentina	Braito	INAF-OAB

Few numbers about the WG

Allocated time: 150 hrs per 5 years

This value can be higher or lower on the basis of merit of the proposed idea.

At the moment, we have defined 6 projects to be explored within the GTO.

Topics that raised interest in the team

Blazars	Fundamental Physics with blazars
AGN spectral monitoring	AGN feedback
High-z	Changing look AGN
Extreme Variability (non-Blazar) AGN	AGN Classification
AGN spectral monitoring	SNe in AGN
QSO and environment	TDE/SN dust echoes
TDEs in AGN	

Rule of the game

Targets and observation should be driven by Time-domain context, ToO (target of opportunity), transient sources, variability, ecc.
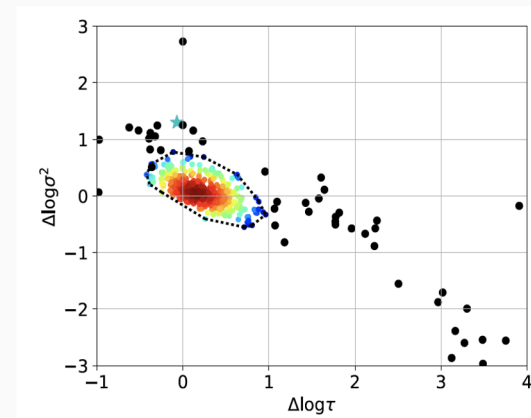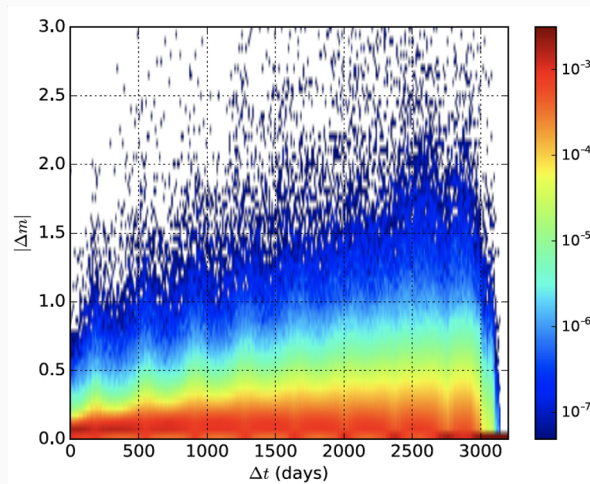
We designed our projects (taking into account also the physics of AGN itself) by considering this requirement on the GTO

Identified Projects

Extreme Variable AGN (EVAGN)

Franz Bauer, Demetra Decicco, Seppo Mattila et al.

Requested time: Assuming 5-10 flare per years, V around 18 and logarithmically spaces spectral observation is **30-50hrs**


Figs. from Graham+17, showing AGN variability
(*left*) Joint probability distribution of magnitude difference and time lag from the ensemble of known quasars. Key point is that Δm>1-1.5 are very rare. (*right*) Distribution of damped random walk (DRW) parameter differences between the time series with and without the primary flare. The black dotted line indicates the contour level used to identify outliers (flare candidates)..

Monitoring Changing look AGN

Paola Marziani, Marco Berton, Suvendu Rakshit, Seppo Mattila et al.

Requested time: 1 jobs/month, with the aim of tightening the cadence in case the objects start showing variability is **30 hrs.**
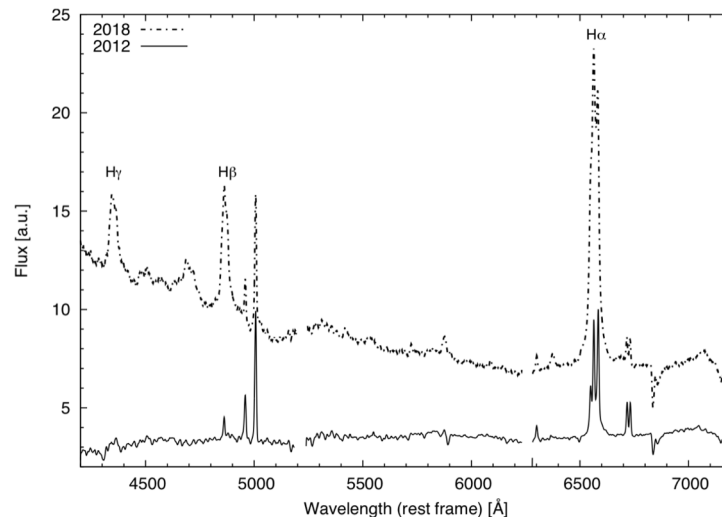
Different epochs of NGC 3516, from Ochman et al. 2020

The goal is to identify the physical origin of this behaviour. Changes in accretion rate? Transient phenomena, such as nuclear supernovae, or TDEs?

Flaring sources can be monitored based on ToO.

UV-optical-IR variability of highly accreting jetted quasars

Marco Berton, Paola Marziani, et al.

Requested time: **15 hrs. Assuming SNR = 30 with exposure time of 1800sec and assuming average Vmag = 17 for few sources in flare.**

Concept: Follow-up gamma-ray flares in order to determine if and how the emission lines are responding to the flare.

NIR coverage of SOXS is a unique opportunity.
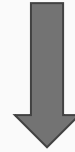
Goal: Provide important indications on the position and the structure of the line-emitting region

ermi
Gamma-ray
Space Telescope
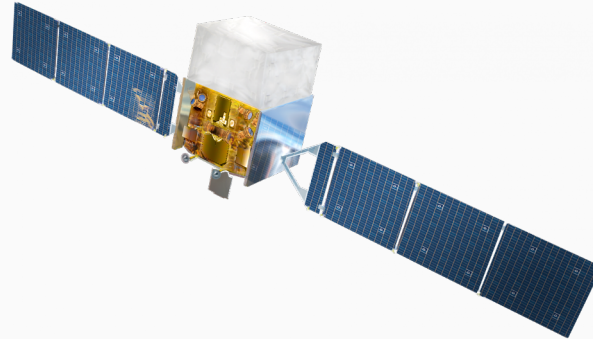
Blazars
(Work in progress)

Marco Landoni, Silvia Belladitta,
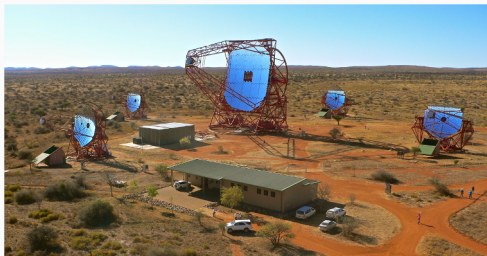*Roberto Della Ceca, Roberto Serafinelli,*
et al.

Requested time: depends on the number of robust flaring targets. A reasonable estimate could be **30 hrs**

Concept: Follow-up GeV/TeV gamma-ray flares in order to determine response of BLR to jet continuum variation.
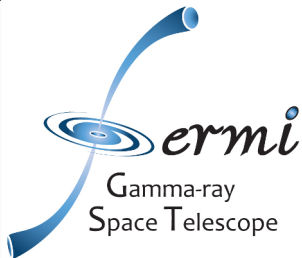
NIR coverage of SOXS is a unique opportunity.

Still an open problem !!
Constrain the location of the emitting SSC blob

Get ToO from flaring sources

Follow up campaign

See e.g. Jedidah et al 2015

# Monitoring of sub-pc binary black hole candidates

Paola Marziani, Marco Berton, Paola Severgnini, Roberto Serafinelli, Valentina Braito, Roberto Della Ceca, Marco Landoni, et al.

Requested time: Variable. We expect bright sources (e.g. Mrk 915) Order of magnitude of few hours (10-15 hrs for the whole project).

At least every massive galaxy harbors a SMBH

SMBBH (pc and sub-pc scale) are the natural result of the current ΛCDM cosmological paradigm, in which galaxies grow hierarchically through minor or major mergers.
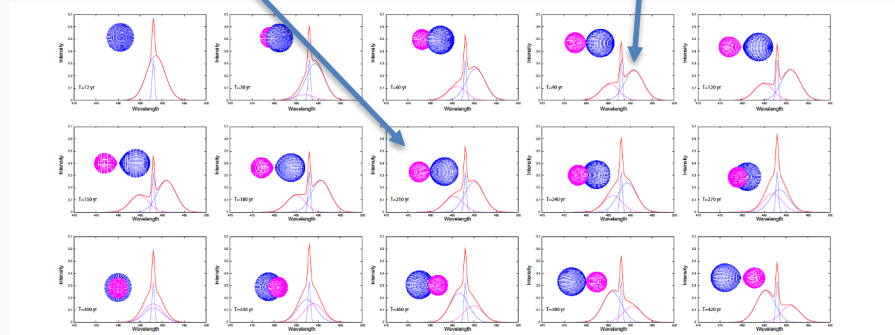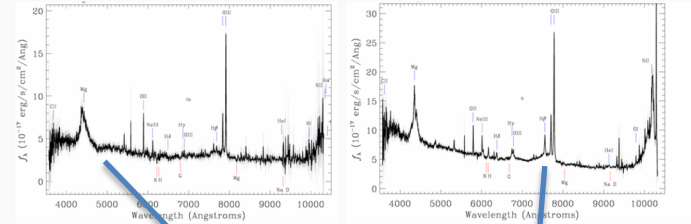
AGN spectral monitoring

Suvendu Rakshit, Marco Berton, Jari Kotilainen et al.

Requested time: 15 hrs for the whole project

Reverberation mapping observations of well-selected southern AGNs with SOXS. With an extended wavelength coverage, SOXS will allow first simultaneous optical and IR spectroscopic reverberation mapping.

NIR capabilities of SOXS will be almost unique for RM of selected sources.

Ideal targets:

PKS 2004-447, a gamma-ray loud NLS1 at z=0.24
PMN J0948+0022, high variable low luminous AGNs.

~100%

… of the whole GTO time for AGN allocated so far with the first projects (kick off in mid Sept. 2020).

This is really positive, indicating interesting in the AGN community for SOXS

What's next ?

People are warmly welcome!

- People interested in joining the group please send me an email to me (marco.landoni@inaf.it) or to Sergio (sergio.campana@inaf.it)
- Open group - people can put all their ideas into our shared document for discussion
- Regular meeting (1 per months, more frequent in the near future)
- If you think to have good ideas for observation of AGN… please tell us !

Questions ?