

# A new survey technique at soft gamma-ray energies

*Thursday, 21 June 2012 15:40 (25 minutes)*

In the view of the so-called Active Galactic Nuclei (AGN) unified model the nuclear activity is powered by a super-massive black hole (SMBH) at the center of the AGN. An optically thick gas-dust structure surrounding the SMBH absorbs efficiently the nuclear radiation.

Current surveys of the INTEGRAL Soft-Gamma Ray Imager (IBIS/ISGRI) and of the Burst Alert Telescope (BAT) on board the Swift satellite have proven to be a powerful technique to detect AGNs at soft gamma-ray energies.

BAT and IBIS/ISGRI are coded-mask detectors having two major advantages:

1) they have a huge field of view, hence allowing to detect a large number of AGNs 2) they operate at soft gamma-rays, hence collecting photons that are energetic enough to pierce efficiently through the gas-dust structure surrounding the SMBH. However the sensitivity of coded-mask detectors is limited by heavy systematic uncertainties. Furthermore by design they block ~50% of the incident photons causing an increase of statistical noise. This prevents the detection of the most absorbed AGNs.

In this talk I will show that the BAT and the IBIS/ISGRI observations can be merged in order to produce a deep sky survey less susceptible to systematic and statistical noise. The survey of this virtual new mission extends over a wide sky area of  $6200 \text{ deg}^2$  sampling 113 sources. The scientific outcome from the study of the sample has been properly addressed to study the evolution of AGNs in the local Universe. Our results are compared to other missions and predictions on future scheduled missions are made. I discuss also the expected results when applying this survey to the entire extragalactic sky and preliminary results of this survey on the Galactic center are shown.

**Primary author:** Dr BOTTACINI, Eugenio (Stanford University)

**Presenter:** Dr BOTTACINI, Eugenio (Stanford University)

**Session Classification:** The gamma-ray sky