X-RAY ASTRONOMY 2019
Current Challenges and New Frontiers in the Next Decade
8-13 September 2019
CNR/INAF Research Area, Bologna, Italy

Contribution ID: **210** Type: **Contributed**

Resolving X-ray Obscuration Biases with Isotropic AGN Selection – First Results from the NuLANDS Legacy Survey

Thursday, 12 September 2019 11:40 (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.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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Session Classification: ACTIVE GALACTIC NUCLEI