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Current Challenges and New Frontiers in the Next Decade

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

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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.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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