

Title: Astrophysical processes near compact objects: studying extremal energy shifts from accretion rings

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Abstract: The X-ray emission from inner regions of an accretion disk around black holes provides wealth of information about matter in extreme conditions. A spectral profile of radiation from a narrow circular ring has a characteristic double-horn profile. Red and blue peaks of the profile are close to the extremal values of the energy shift. We describe a useful approach to calculate the extremal energy shifts in the regime of strong gravity. We discuss if the radial structure of the disk emission could be reconstructed using extremal energy shifts of the individual rings. For this purpose, we simulate artificial data from a bright active galactic nucleus and show that the required sensitivity and energy resolution can be reached with the proposed LOFT mission.

Keywords: black hole physics, accretion disks, galactic nuclei