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Following up SMBH binaries candidates with NICER to search for periodic variability.

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Supermassive black hole binaries (SMBHBs) represent the latest stage in the hierarchical growth of massive galaxies through major mergers. In these systems, accretion onto the black holes is expected to form two individual accretion disks around each black hole, fed by a larger circumbinary disk. Consequently, the X-ray and UV emission from these systems is expected to vary regularly, with periods comparable to that of the binary orbit. We searched the eROSITA all-sky scans for quasi-periodic signals in extragalactic sources that exhibit an ‘up-down-up-down’ or ‘down-up-down-up’ profile in their flux light curve, in the 0.2 – 2.3 keV band, indicating potential periodic variability. Despite the six-month cadence of the eROSITA observations, higher cadence monitoring programs are required to populate the light curves sufficiently to confirm or rule out their binary SMBH nature. In this talk, I will present preliminary results on the most promising candidates and their extensive NICER monitoring campaigns to confirm or reject their tentative periodicity. We will also estimate the detection rate of SMBHBs based on our searches for periodicity in the X-ray light curves and compare this to theoretical predictions.

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