



- RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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Searching for sub-pc supermassive black hole binary candidates in the hard X-rays

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Supermassive black hole binaries (SMBHB) are a natural outcome of the hierarchical mergers predicted by the Λ CDM cosmology, and promising sources of nanohertz continuous gravitational wave signals. However, their detection remains elusive. Since hard X-rays are produced in the innermost regions of active galactic nuclei, they are predicted to show the best signatures of SMBHB, namely a double-peaked iron emission line and a periodic light curve (Sesana et al. 2012). I will present new results of a search for SMBHB candidates based on the analysis of decade-long Swift-BAT hard X-ray ($E = 14 - 195$ keV) light curves. A power spectrum-based pipeline that takes colored noise into account was applied on the whole catalog, and the most significant candidates for periodic light curves are here presented.

Particularly, we focused on the Seyfert 2 galaxy MCG+11-11-032, because evidence for a double-peaked profile of the Fe K α line was recently reported (Severgnini et al. 2018). We identified a significant ($\sim 4\sigma$) power spectrum peak in the Swift-BAT hard X-ray light curve, at frequency $f_0 = 15 \pm 2$ nHz, i.e. $P_0 = 26 \pm 4$ months. This value is consistent with the hypothesis of a sub-pc scale SMBHB, already suggested in Severgnini et al. (2018). These new results confirm that MCG+11-11-032 may host one of the most promising SMBHB candidates to date.

Topic

Multi-messenger and transient astronomy

Affiliation

INAF - Osservatorio Astronomico di Brera

Primary author: SERAFINELLI, Roberto (Istituto Nazionale di Astrofisica (INAF))

Co-authors: SEVERGNINI, Paola (Istituto Nazionale di Astrofisica (INAF)); CICONI, Claudia (Istituto Nazionale di Astrofisica (INAF)); BRAITO, Valentina; DELLA CECA, Roberto (Istituto Nazionale di Astrofisica (INAF)); Prof. VIGNALI, Cristian (Dipartimento di Fisica e Astronomia, Università di Bologna); Dr AMBROSINO, Filippo (INAF - Istituto di Astrofisica e Planetologia Spaziali); DOTTI, Massimo (Università di Milano Bicocca); Prof. SESANA, Alberto (Università di Milano Bicocca); BALLO, Lucia; LA PAROLA, Valentina (Istituto Nazionale di Astrofisica (INAF)); MATZEU, Gabriele (European Space Agency/European Space Astronomy Centre); ZAINO, Alessandra (Roma Tre University)

Presenter: SERAFINELLI, Roberto (Istituto Nazionale di Astrofisica (INAF))

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