

Detecting and characterizing the X-ray quasi-periodicity from candidate IMBH TDEs

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It is still in dispute the existence of intermediate-mass black holes (IMBHs) with a mass of $\sim 10^3$ - 10^5 solar masses (M_{sun}) which are the missing link between stellar-mass black holes (5-50 M_{sun}) and supermassive black holes (10^6 - $10^{10} M_{\text{sun}}$). Many candidates have been proposed including the black holes in dwarf galaxies, globular clusters, and hyperluminous off-nuclear X-ray sources. Until recently, the bright flares from tidal disruption events (TDEs) provide a new and direct way to probe IMBHs. In this talk, we will report our search for the X-ray quasi-periodicity oscillation signal from IMBH TDEs, and the discovery of a transient X-ray QPO with a period of ~ 85 second (at a significance of >3.5 sigma). Combining with the results from X-ray continuum fittings, the detection of QPO allows for joint constraints on the black hole mass and dimensionless spin in the range $[9.9 \times 10^3 - 1.6 \times 10^4 M_{\text{sun}}]$ and $[0.26 - 0.36]$, respectively. This result supports the presence of an IMBH with a low spin, and may open up the possibility of studying IMBHs through X-ray timing of TDEs, such as EP.

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