

Quasi-periodic X-ray eruptions years after a nearby tidal disruption event

Tuesday, October 15, 2024 2:00 PM (25 minutes)

Quasi-periodic Eruptions (QPEs) are luminous bursts of soft X-rays from the nuclei of galaxies, repeating on timescales of hours to weeks. The mechanism behind these rare systems is uncertain, but most theories involve accretion disks around supermassive black holes (SMBHs), undergoing instabilities or interacting with a stellar object in a close orbit. It has been suggested that this disk could be created when the SMBH disrupts a passing star, implying that many QPEs should be preceded by observable tidal disruption events (TDEs). Two known QPE sources show long-term decays in quiescent luminosity consistent with TDEs, and two observed TDEs have exhibited X-ray flares consistent with individual eruptions. TDEs and QPEs also occur preferentially in similar galaxies. However, no confirmed repeating QPEs have been associated with a spectroscopically confirmed TDE or an optical TDE observed at peak brightness. In this talk I will show the detection of nine X-ray QPEs with a mean recurrence time of approximately 48 hours from AT2019qiz, a nearby and extensively studied optically-selected TDE. We detect and model the X-ray, ultraviolet and optical emission from the accretion disk, and show that an orbiting body colliding with this disk provides a plausible explanation for the QPEs.

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