

Researchers used data from a trio of orbiting X-ray telescopes, NASA's Chandra X-ray Observatory and Swift Satellite as well as ESA's XMM-Newton, to find the multiwavelength radiation flares that helped identify the otherwise uncommon IMBHs. The characteristic of a long flare offers evidence of a star being torn apart and is known as a tidal disruption event (TDE). Tidal forces, due to the intense gravity from the black hole, can destroy an object – such as a star – that wanders too close. During a TDE, some of the stellar debris is flung outward at high speeds, while the rest falls toward the black hole. As it travels inward, and is ingested by the black hole, the material heats up to millions of degrees and generates a distinct X-ray flare. According to the researchers, these types of flares, can easily reach the maximum luminosity and are one of the most effective way to detect IMBHs.

“From the theory of galaxy formation, we expect a lot of wandering intermediate-mass black holes in star clusters,” said Lin. “But there are very, very few that we know of, because they are normally unbelievably quiet and very hard to detect and energy bursts from encountering stars being shredded happen so rarely.”

Because of the very low occurrence rate of such star-triggered outbursts for an IMBH, the scientists believe that their discovery implies that there could be many IMBHs lurking in a dormant state in galaxy peripheries across the local universe.

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Caption: Image shows data from NASA/ESA's Hubble Space Telescope (yellow-white) and NASA's Chandra X-ray Observatory (purple). The purple-white source in the lower left shows X-ray emission from the remains of a star that was ripped apart as it fell towards an intermediate mass black hole. The host galaxy of the black hole is located in the middle of the image.

Image Credit: X-ray: NASA/CXC/UNH/D.Lin et al, Optical: NASA/ESA/STScI

Media Contact

Robbin Ray '82 ([/unhtoday/contributor/robbin-ray-82](mailto:robbin-ray@unh.edu)) | Communications and Public Affairs | robbin.ray@unh.edu (<mailto:robbin.ray@unh.edu>) | 603-862-4864

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