

A Hungry Hole

Serendipity, data serve up compelling clues in the search for a hard-to-identify black hole

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Like a sneaky late-night snacker whose midnight munch-ies are exposed by a missing slice of pizza, an elusive type of black hole has recently been discovered by space scientists — thanks to the disappearance of a nearby star. Astrophysicists have long suspected that our universe is home to intermediate-mass black holes, but their existence has proven considerably harder to document than their small and super-massive counterparts. In June, UNH Space Science Center research assistant professor Dacheng Lin published a paper in *Nature Astronomy* that provides the strongest evidence to date that these middle-of-the-road black holes do exist, based on data captured as one devoured a star that encountered its gravitational field.



ILLUSTRATION BY CHRIS MURPHY

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A black hole is a region of space with such strong gravitational pull that nothing — not even electromagnetic radiation such as light — can escape from inside it. Because no light can get out, black holes are invisible, and they can be “seen” only by documenting their effect on surrounding objects. Beginning in October 2003, Lin used satellite imagery to measure an enormous radiation flare that decayed over the course of a decade in exactly the manner that would be expected of a star being consumed by an intermediate-mass black hole. Earlier research — including Lin’s own work — had pointed toward similar events, but they were either caught too far into the star’s destruction to provide reliable data or were too far away for available instruments to measure accurately.

“We feel very lucky to have spotted this object with a significant amount of high-quality data, which helps us pinpoint the mass of the black hole and understand the nature of this spectacular event,” Lin says.

Lin and his fellow space scientists have worked hard to find mid-sized black holes because confirmation of their existence is important in astrophysics. “But there are very, very few that we know of,” he says, “because they are normally unbelievably quiet and very hard to detect, and energy bursts from encountering stars being shredded happen so rarely.”

The combination of luck and persistence that led to finding this particular intermediate-mass black hole suggests to Lin and his colleagues that there could be many more out there, lurking dormant in galaxies across the universe. Finding them is a matter of the stars lining up just right.

WRITTEN [Robbin Ray '82](#) | Communications and Public Affairs |
BY: robbin.ray@unh.edu | 603-862-4864

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