Researchers discover star orbiting a 'medium-sized' black hole

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University of Iowa researchers have found a star orbiting a "medium-sized" black hole -- about 1,000 times more massive than the sun -- in the nearby starburst galaxy M82, a development that may help explain how medium-sized black holes form and evolve, according to a paper to be published in the Jan. 5 issue of Science Express, the online version of the journal *Science*.

Philip Kaaret, associate professor in the UI College of Liberal Arts and Sciences Department of Physics and Astronomy, made the discovery indirectly, by detecting modulations in X-rays produced by the black hole. His associates in the work were assistant professor Cornelia Lang and student Melanie Simet, a senior from Cedar Falls, Iowa.

"We discovered that the X-rays from the black hole get repeatedly brighter and dimmer every 62 days," he said. "This told us that the companion star orbiting around the black hole makes one orbit every 62 days. This, in turn, told us that the companion star has to be a giant star -- a phase in the evolution of a star when it becomes extremely bloated."

Kaaret said that the discovery may help confirm the existence of a class of black holes having a mass between 100 and 10,000 times that of the sun. That would make the objects larger than black holes produced by the collapse of a single normal star and smaller than the supermassive black holes found at the centers of galaxies.

"The discovery also explains why this black hole is so bright in X-rays.

It's because the black hole can pull gas directly off from the outer layers of the giant star," Kaaret said.

The UI researchers, who used an x-ray telescope called the "Proportional Counter Array on NASA's Rossi X-Ray Timing Explorer," note that their discovery will await validation by new observations to be made with the Proportional Counter Array and other X-ray telescopes.

"This first discovery proves our technique, and we hope to make more discoveries with new X-ray observations of other black holes," Kaaret said.

Source: University of Iowa

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