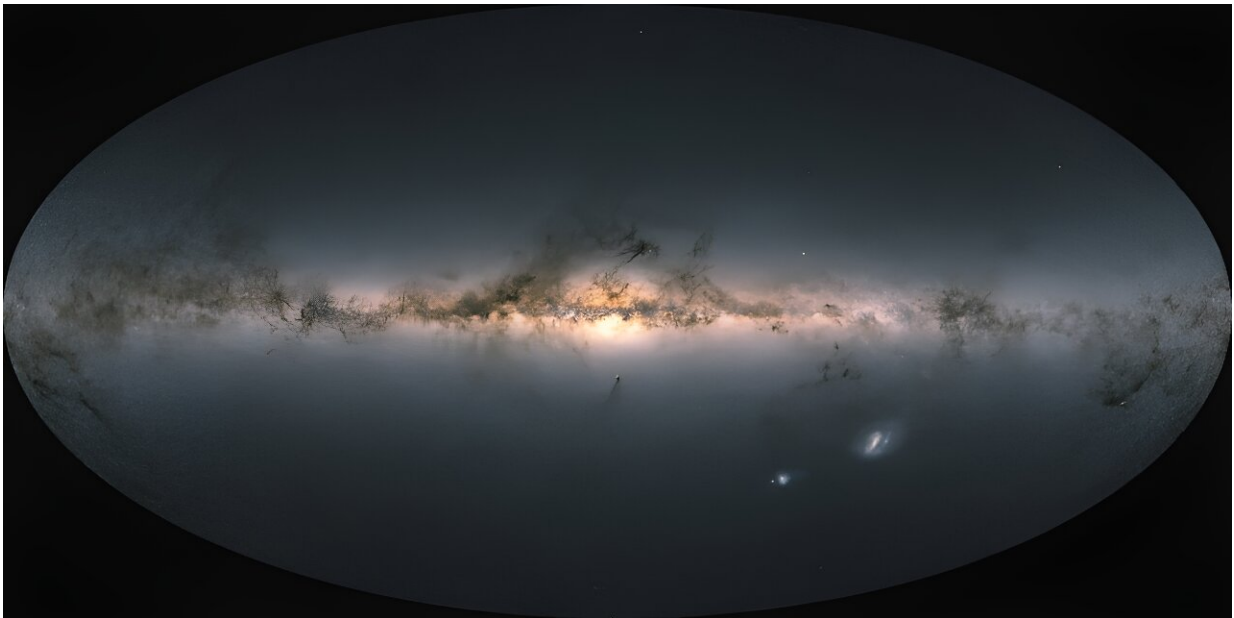


Astronomers discover largest stellar black hole in Milky Way: Study

April 20 2024, by Juliette COLLEN



A stellar black hole has been identified in the Milky Way.

Astronomers identified the largest stellar black hole yet discovered in the Milky Way, with a mass 33 times that of the Sun, according to a study published on Tuesday.

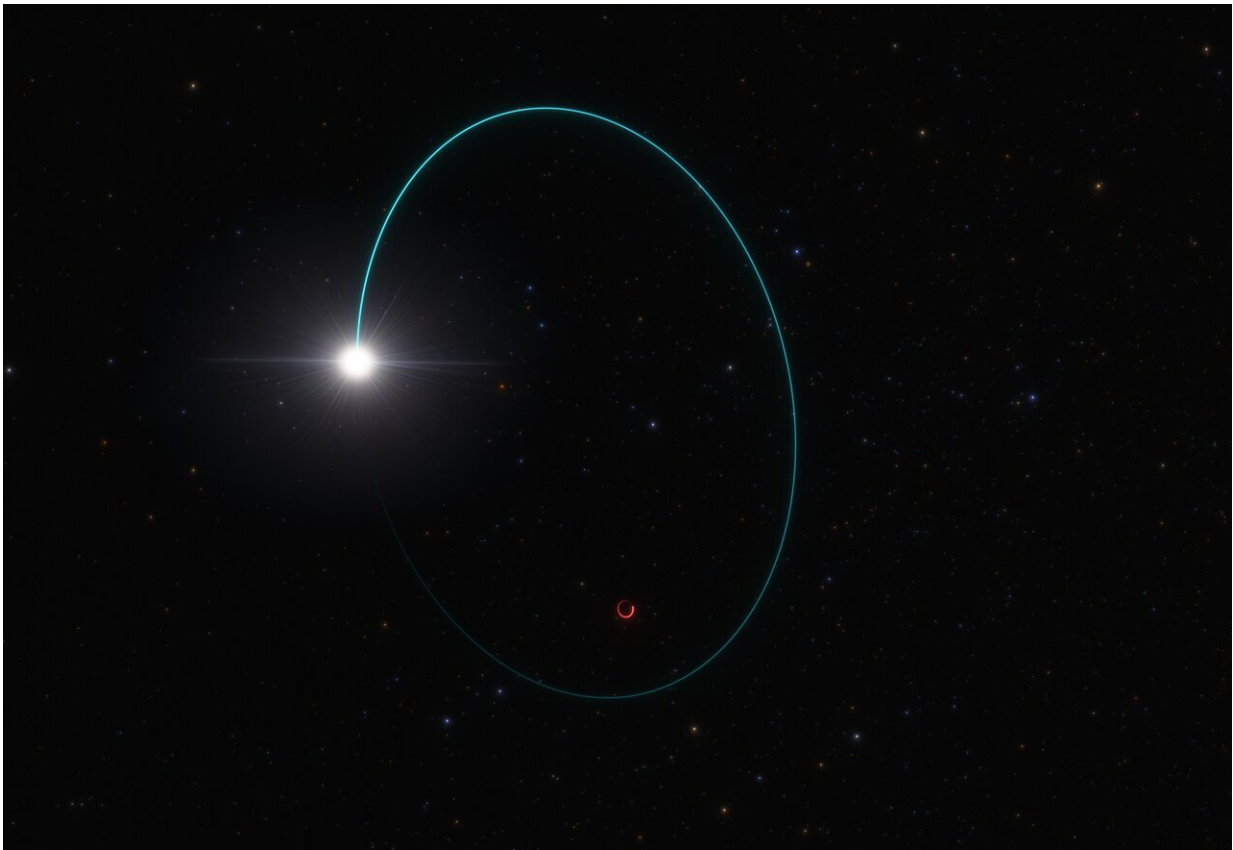
The black hole, named Gaia BH3, was discovered "by chance" from data collected by the European Space Agency's Gaia mission, an astronomer from the National Centre for Scientific Research (CNRS) at the

Observatoire de Paris, Pasquale Panuzzo, told AFP.

Gaia, which is dedicated to mapping the Milky Way galaxy, located BH3 2,000 [light years](#) away from Earth in the Aquila constellation.

As Gaia's telescope can give a precise position of stars in the sky, [astronomers](#) were able to characterize their orbits and measure the mass of the star's invisible companion—33 times that of the Sun.

Further observations from on-the-ground telescopes confirmed that it was a black hole with a mass far greater than the stellar black holes already in the Milky Way.



Astronomers have found the most massive stellar black hole in our galaxy,

thanks to the wobbling motion it induces on a companion star. This artist's impression shows the orbits of both the star and the black hole, dubbed Gaia BH3, around their common center of mass. This wobbling was measured over several years with the European Space Agency's Gaia mission. Additional data from other telescopes, including ESO's Very Large Telescope in Chile, confirmed that the mass of this black hole is 33 times that of our sun. The chemical composition of the companion star suggests that the black hole was formed after the collapse of a massive star with very few heavy elements, or metals, as predicted by theory. Credit: ESO/L. Calçada

"No one was expecting to find a high-mass black hole lurking nearby, undetected so far. This is the kind of discovery you make once in your research life," Panuzzo said in a press release.

The stellar black hole was discovered when scientists spotted a "wobbling" motion on the companion star that was orbiting it.

"We could see a star a little smaller than the Sun (around 75 percent of its mass) and brighter, that revolved around an invisible companion," Panuzzo said.

Stellar black holes are created from the collapse of massive stars at the end of their lives and are smaller than [supermassive black holes](#) whose creation is still unknown.

Such giants have already been detected in distant galaxies via [gravitational waves](#).

But "never in ours", said Panuzzo.

BH3 is a "dormant" black hole and is too far away from its [companion star](#) to strip it of its matter and therefore emits no X-rays—making it

difficult to detect.

Gaia's telescope identified the first two inactive black holes (Gaia BH1 and Gaia BH2) in the Milky Way.

Gaia has been operating 1.5 million kilometers from Earth for the past 10 years and in 2022 delivered a 3D map of the positions and motions of more than 1.8 billion stars.

More information: Discovery of a dormant 33 solar-mass black hole in pre-release Gaia astrometry, *Astronomy & Astrophysics* (2024). [DOI: 10.1051/0004-6361/202449763](https://doi.org/10.1051/0004-6361/202449763)

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