

# 'Tadpole' molecular cloud appears to be playing around black hole

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Artist's Impression of the “Tadpole” Molecular Cloud and the black hole at the gravitational center of its orbit. Credit: Keio University

A peculiar cloud of gas, nicknamed the Tadpole due to its shape, appears to be revolving around a space devoid of any bright objects. This suggests that the Tadpole is orbiting a dark object, most likely a black hole 100,000 times more massive than the sun. Future observations will help determine what is responsible for the shape and motion of the Tadpole.

A team of Japanese researchers led by Miyuki Kaneko at Keio University used data from the James Clerk Maxwell Telescope, operated by the East Asian Observatory, and NAOJ's Nobeyama 45-m Radio Telescope to identify an unusual cloud of gas about 27,000 light-years away in the constellation Sagittarius.

The curved "Tadpole" shape of the molecular gas cloud strongly suggests that it is being stretched as it orbits around a massive compact object. The only problem is, at the center of the Tadpole's orbit, there are no bright objects which could be massive enough to gravitationally hold the Tadpole. The best candidate for this massive compact invisible object is a black hole.

Because black holes don't emit light, the only way to detect them is when they interact with other objects. This leaves astronomers in the dark about just how many [black holes](#), and with what range of masses, might be lurking in the Milky Way.

Now the team plans to use ALMA (Atacama Large Millimeter/submillimeter Array) to search for faint signs of a black hole, or other object, at the gravitational center of the Tadpole's orbit.

The paper is published in *The Astrophysical Journal*.

**More information:** Miyuki Kaneko et al, Discovery of the Tadpole Molecular Cloud near the Galactic Nucleus, *The Astrophysical Journal*

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