

# A planetary system that never was teaches about those that may be

May 23 2012, By Jon Voisey

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While Kepler and similar missions are turning up planets by the fist full, there's long been many places that astronomers haven't expected to find planetary systems. The main places include regions where gravitational forces conspire to make the region around potential host stars too unstable to form into planets. And there's no place in the galaxy with a larger gravitational force than the galactic center where a black hole four and a half million times more massive than the Sun, lurks. But [a new study](#) shows evidence that a disk, potentially far enough along to begin forming planets, is in the process of being disrupted.

The new study investigates an ionized cloud of gas discovered earlier this year, plummeting in towards the black hole. The cloud has been formed into an elliptical ring with a maximum distance of 0.04 parsecs (1 parsec 3.24 light years) which is coincident with a ring of young [stars](#) that orbit the black hole. At such distances from us, astronomers have been unable to learn much about the population of stars that may exist since only the brightest, most [massive stars](#) are visible.

However, such massive stars are able to determine an age limit for the group, which has been set somewhere between 4-8 million years. This age is crucial since most low-mass stars retain gas disks and are held to form planets at an age around 3 million years young. But by an age of 5 million years, the stars have begun clearing out that disk system halting planetary formation and only one fifth of stars less than 1 solar mass retain their disks.

This entire process is even more precarious because the gravitational perturbations from the nearby black hole would begin eating away at the edge of a potential disk. Astronomers predict that this should limit the size to 12 AU in radius. For even less massive stars, this could be as small as 8 AU. Still, theory predicts that these truncated disks could form in the vicinity of the Milky Way's black hole. But such small disks would be impossible to observe directly with present technology.

The new research suggests that one of these stars was knocked from its stable orbit in the ring in much the same way that comets in the Oort cloud are occasionally jostled into falling towards the inner solar system. There, the tidal forces from the black hole as well as heavily ionizing UV radiation created by the black hole's accretion disk would strip the gas and dust from the parent star, which is too faint to see directly, leaving it in an elliptical orbit.

If this theory is correct, it would provide the first indirect evidence of the presence of planet forming disks near the [galactic center](#). This comes on top of evidence from earlier this year suggesting stars may be able to form in situ near the galactic center making this region a far more dynamic place than previously expected.

Yet, even if [planets](#) do form, living near a supermassive black hole is still not a hospitable place for life. The extreme amounts of UV radiation emitted as the black hole devours gas and dust is likely to sterilize the region.

Source: [Universe Today](#)

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