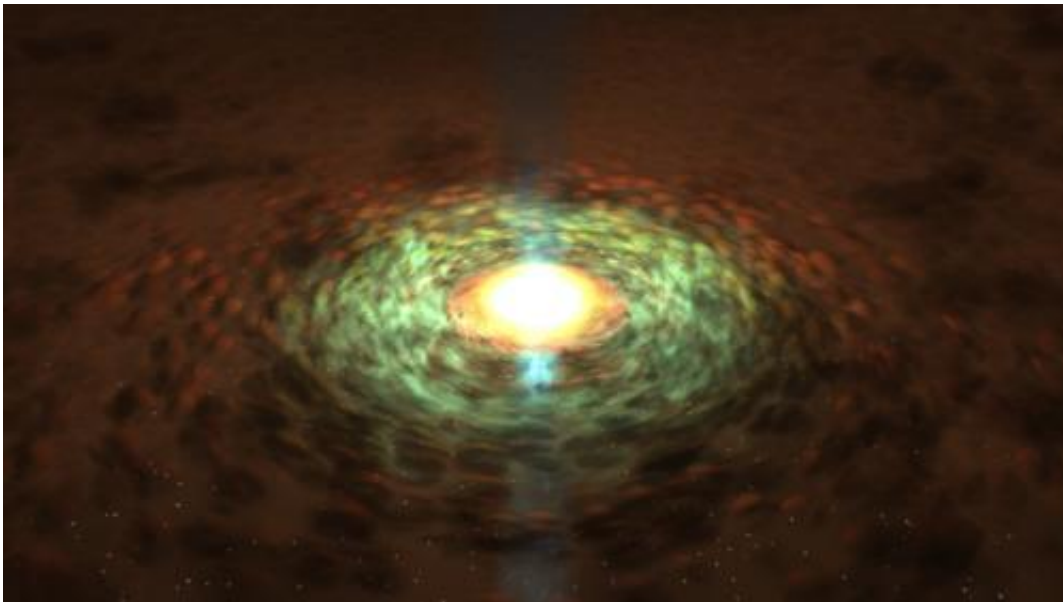


# Clouds seen circling supermassive black holes (w/ video)

February 19 2014

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Credit: NASA

Astronomers see huge clouds of gas orbiting supermassive black holes at the centers of galaxies. Once thought to be a relatively uniform, fog-like ring, the accreting matter instead forms clumps dense enough to intermittently dim the intense radiation blazing forth as these enormous objects condense and consume matter, they report in a paper to be published in the *Monthly Notices of the Royal Astronomical Society*, available online now.

Evidence for the clouds comes from records collected over 16 years by NASA's Rossi X-ray Timing Explorer, a satellite in low-earth orbit equipped with instruments that measured variations in X-ray sources. Those sources include [active galactic nuclei](#), brilliantly luminous objects powered by [supermassive black holes](#) as they gather and condense huge quantities of dust and gas.

By sifting through records for 55 active galactic nuclei Alex Markowitz, an astrophysicist at the University of California, San Diego and the Karl Remeis Observatory in Bamberg, Germany and colleagues found a dozen instances when the X-ray signal dimmed for periods of time ranging from hours to years, presumably when a cloud of dense gas passed between the source and satellite.

Mirko Krumpke of the European Southern Observatory in Garching, Germany and Robert Nikutta, of Andrés Bello University in Santiago, Chile co-authored the report, which confirms what recent models of these systems have predicted.

The clouds they observed orbit a few light-weeks to a few light-years from the center of the active galactic nuclei. One, in a spiral galaxy in the direction of the constellation Centaurus designated NGC 3783, appeared to be in the midst of being torn apart by tidal forces.

**More information:** The researchers publish their work in "First X-ray-based statistical tests for clumpy-torus models: eclipse events from 230 years of monitoring of Seyfert AGN", A. G. Markowitz, M. Krumpke and R. Nikutta, *Monthly Notices of the Royal Astronomical Society*, in press. [mnras.oxfordjournals.org/cont.../02/04/mnras.stt2492](https://mnras.oxfordjournals.org/cont.../02/04/mnras.stt2492)

Provided by University of California - San Diego

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