



Chandra Science Highlight

NASA's Chandra Finds Small Galaxies May Buck the Black Hole Trend

- Smaller galaxies may not contain supermassive black holes nearly as often as larger ones, according to a new finding.
- This study looked at X-ray signatures from over 1,600 galaxies that have been observed over two decades by NASA's Chandra.
- The researchers found that galaxies with less than 3 billion solar masses did not have giant black holes nearly as often as bigger galaxies.
- Astronomers are interested in this because it has important implications for understanding how supermassive black holes formed.

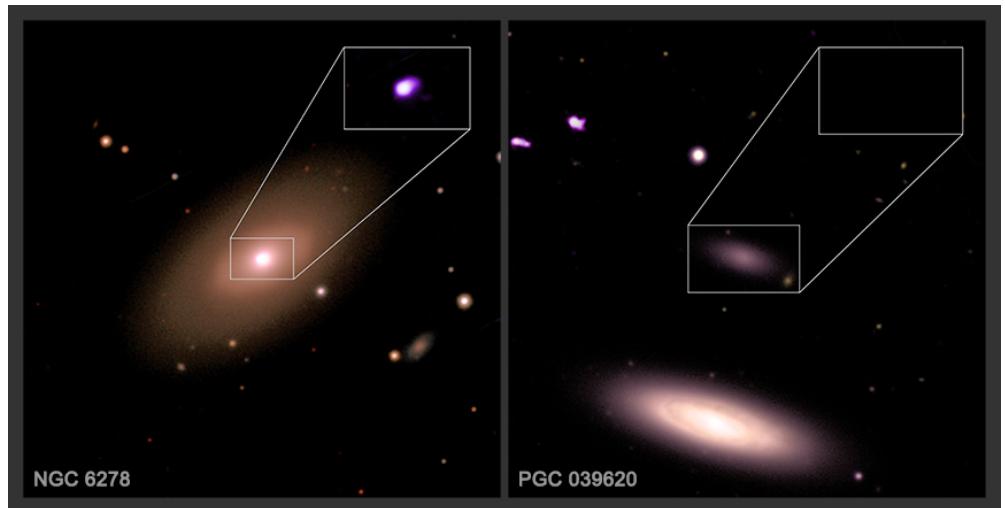
Distance estimates: 127 million and 61 million light-years from Earth

Credit: X-ray: NASA/CXC/SAO/F. Zou et al.; Optical: SDSS; Image Processing: NASA/CXC/SAO/N. Wolk

Instrument: ACIS

Reference: Zou, F. et al. 2025, ApJ, 992, 176

More information: The detailed caption and other graphics materials are here: <https://chandra.harvard.edu/photo/2025/smbhs/>



The two galaxies shown here, NGC 6278 and PGC 039620, are representative of the galaxies in the new study. In optical and X-ray images (X-rays are purple), both galaxies are seen in optical light data from the Sloan Digital Sky Survey. The insets contain just the X-ray data from Chandra. NGC 6278 is roughly the same size as our home galaxy and has X-rays detected from its core. The presence of bright X-rays in the middle of galaxies like NGC 6278 is a clear signature that there is a supermassive black hole in the center. PGC 03620 on the other hand is a much smaller galaxy and does not show any evidence of an X-ray source. Other low mass galaxies in the study also lack detectable X-ray sources in their centers. A careful analysis of the data showed that the lack of X-ray sources implies that most of these galaxies are lacking supermassive black holes in their centers, rather than that X-rays from material falling into a black hole being too faint to be detected.

**The Chandra X-ray Center is operated for NASA by
the Smithsonian Astrophysical Observatory**



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