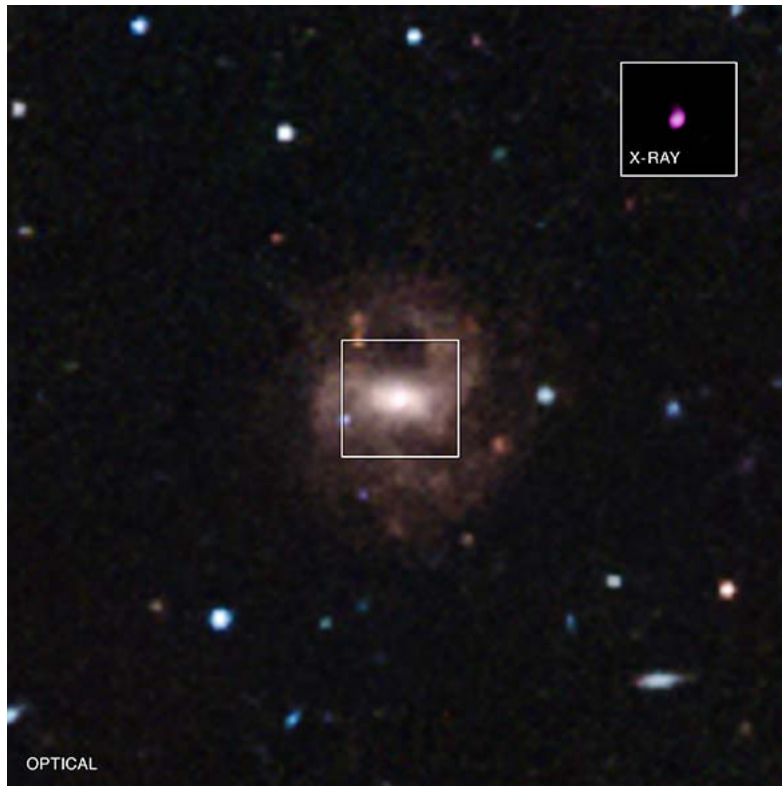




# Chandra Science Highlight

## RGG 118: Smallest Supermassive Black Hole Provides Clues to Growth



**Scale:**

Image is 3.2 arcmin across  
(about 317,000 light years)

**Distance Estimate:**

340 million years  
(redshift  $z=0.0243$ )

Sloan Digital Sky Survey image of RGG 118, with the inset showing the Chandra image of the galaxy's center.

- ❑ RGG 118 is a dwarf disk galaxy, with a stellar mass  $\sim 2.5$  billion solar masses.
- ❑ Optical observations of the width of spectral lines from hydrogen atoms are used to estimate a central black hole mass  $\sim 50,000$  solar masses.
- ❑ The Chandra image reveals an X-ray point source produced by accretion of gas onto a black hole in the center of the galaxy, at a rate consistent with the optical estimate of black hole mass.
- ❑ The mass of the black hole in RGG 118 is the smallest yet detected in a galaxy nucleus. For comparison, the black hole at the center of our galaxy has a mass of about 4 million solar masses, and other extremely massive black holes have masses of several billion solar masses.
- ❑ The RGG black hole and its host galaxy behave in several respects like a scaled-down version of the larger black holes and their hosts, and may provide important clues for understanding the formation and growth of the much larger black holes.

**Reference:** Baldassare, V.F. et al, 2015, ApJ (accepted); arXiv:1506.07531

**Credit:** NASA/CXC/Univ of Michigan/V.F.Baldassare, et al; Optical: SDSS

**Instrument:** Chandra ACIS Observation

**CXC Operated for NASA by the  
Smithsonian Astrophysical Observatory**



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