



**Chandra X-ray  
Observatory Center**

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**Abell 644 and SDSS J1021+131:** Two galaxies, 920 million and 1.1 billion light years away from Earth respectively, used in a new study of supermassive black holes.

(Credit: X-ray: NASA/CXC/Northwestern Univ/D.Haggard et al, Optical: SDSS)

**Caption:** The galaxy on the left, Abell 644, is in the center of a cluster of galaxies. The right panel contains SDSS J1021+131, a so-called field galaxy because it is isolated. Both images are composites with data from Chandra (blue) and the Sloan Digital Sky Survey (red, yellow, white). A survey of these and hundreds of other galaxies tells scientists how often the biggest black holes in field galaxies like SDSS J1021+131 have been active over the last few billion years. This has important implications for how environment affects black hole growth.

**Scale:** Abell 644 Image is 13.2 arcmin across. SDSS J1021+131 Image is 3.2 arcmin across.

*Chandra X-ray Observatory ACIS Image*

*CXC operated for NASA by the Smithsonian Astrophysical Observatory*