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*

---

Chandra X-ray Observatory Center
Harvard-Smithsonian Center for Astrophysics
60 Garden St. Cambridge, MA 02138 USA
http://chandra.harvard.edu