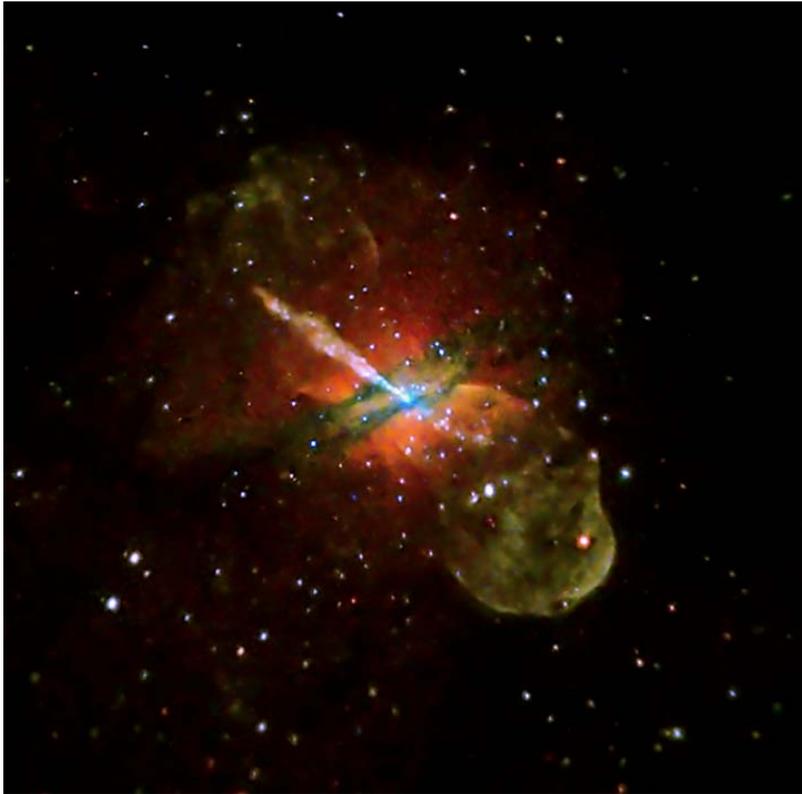




Chandra Science Highlight

Centaurus A: X-ray Image of An Active Galaxy



Estimated distance to Centaurus A: 11 million light years

Chandra X-ray Observatory ACIS image.

Credit: NASA/CXC/CfA/R.Kraft et al

Reference: M. Hardcastle et al., 2007, ApJ, 670 L81

A dramatic new Chandra image of the nearby galaxy Centaurus A provides one of the best views to date of the effects of an active supermassive black hole. In this image, low-energy X-rays are colored red, intermediate-energy X-rays are green, and the highest-energy X-rays detected by Chandra are blue. The image was made from an ultra-deep observation equivalent to more than seven days of continuous observations.

- A prominent X-ray jet extending for 13,000 light years points to the upper left in the image, with a shorter "counterjet" aimed in the opposite direction. Such jets are important vehicles for transporting energy from the black hole to the much larger dimensions of a galaxy, and affecting the rate at which stars form there.
- High-energy electrons spiraling around magnetic field lines produce the X-ray emission from the jet and counterjet. Because of the short radiative lifetime (tens of years), of the electrons, high-resolution X-ray observations show where the acceleration of particles to high energies is currently occurring.
- The inner part of the X-ray jet close to the black hole is dominated by knots of X-ray emission, which probably come from shock waves caused by the jet.
- The spectra and structure of the outer parts of the jet are different from the inner knots, indicating that a different particle acceleration process is involved.
- The dark green and blue bands running likely created when Centaurus A merged with another galaxy perhaps 100 million years ago.