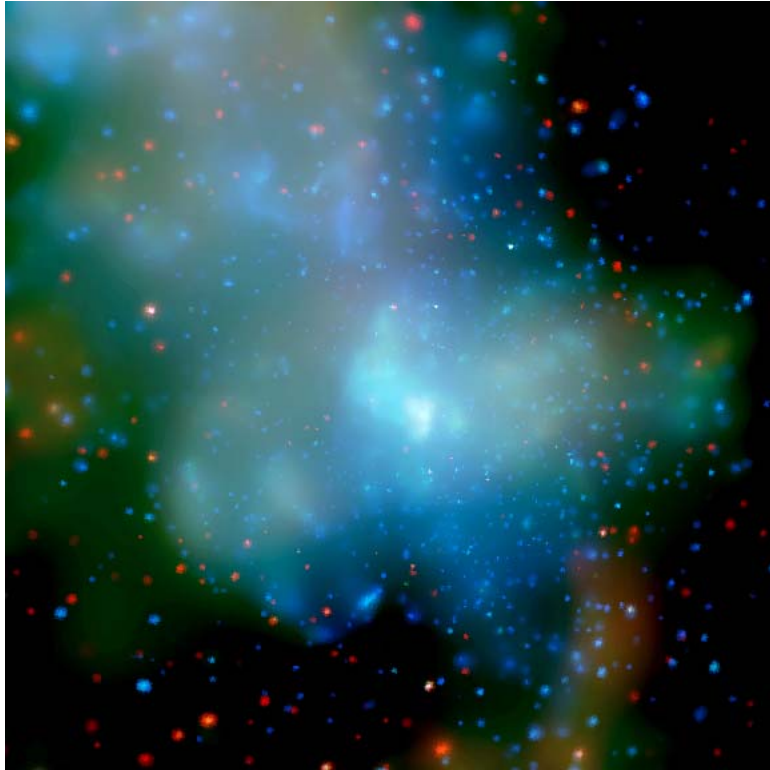




Chandra Science Highlight

HOT GAS IN THE GALACTIC CENTER



This image is from a deep exposure (174 hours) of a 130 light year region in the center of the Milky Way. The colors represent low (red), medium (green) and high (blue) energy X-rays. Chandra's unique resolving power enabled astronomers to identify thousands of point-like X-ray sources due to neutron stars, black holes, white dwarfs, foreground stars, and background galaxies. What remains is a diffuse X-ray glow extending from the upper left to the lower right, along the direction of the disk of the Galaxy.

- The spectrum of the diffuse glow is consistent with a hot gas cloud that contains two components – 10-million-degree Celsius gas and 100-million-degree gas.
- The diffuse X-rays appear to be the brightest part of a ridge of X-ray emission that stretches for several thousand light years along the disk of the Galaxy. This implies that the gas is probably not being heated by the supermassive black hole at the center of the Milky Way, which is the bright source slightly below the center of the image.
- Shock waves from supernova explosions are the most likely explanation for heating the 10-million-degree gas, but how the 100-million-degree gas is heated is not known.
- Ordinary supernova shock waves can't heat the gas to 100 million degrees, and heating by very high-energy particles produces the wrong spectrum of X-rays.
- An explanation in terms of an unresolved population of point sources would require 200,000 such sources. There is no known class of objects that could account for such a large number of high-energy X-ray sources in the center of the Milky Way.

Reference: M. Munro et al. 2004, The Astrophysical Journal, Sept. 20 issue