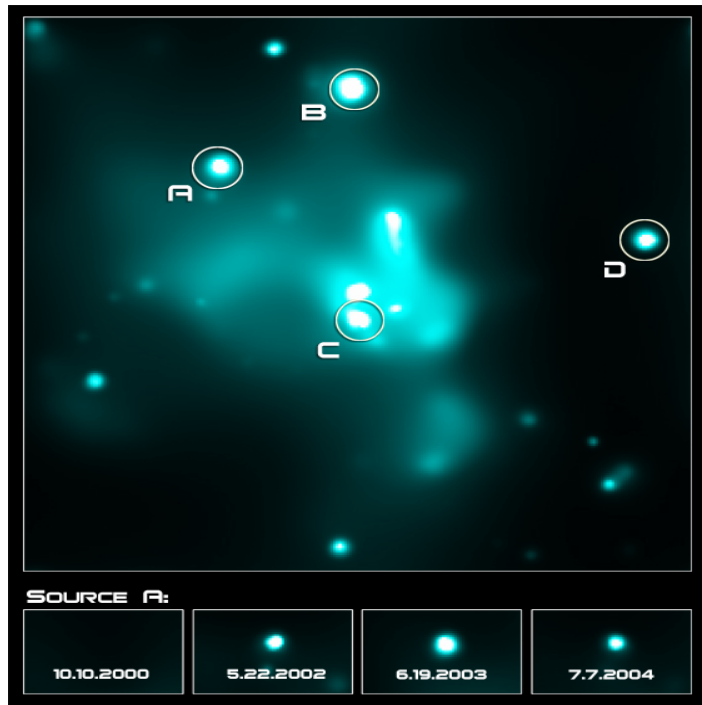




# Chandra Science Highlight

## Evidence for A Swarm of Black Holes in the Galactic Center

Chandra X-ray Observatory ACIS Image



- The strong X-ray variability of the four sources in the image is indicative of an X-ray binary system where a black hole or neutron star is pulling matter from a nearby companion star.
- Based on the numbers of X-ray sources found in a larger region around Sgr A\* (70 light years in diameter), astronomers expected that there was only a 20 percent chance that one X-ray binary would be detected within a three-light-year radius.
- The observed high concentration of X-ray binaries is strong circumstantial evidence that 10,000 or more stellar black holes and neutron stars have gathered in the center of the Galaxy.
- The swarm likely formed as stellar-mass black holes, and to a lesser extent, neutron stars, gradually sank toward the center of the Galaxy over the course of several billion years as a consequence of a process called dynamical friction.

Located about 25,000 light years from Earth, the region shown is about 8 light years across. Four bright, variable X-ray sources (circles) were discovered within 3 light years of Sgr A\*, the supermassive black hole located at the center of the Galaxy (the bright source just above source C). The lower panel illustrates the strong variability of Source A. The other sources show similar variability.

*Reference: M. Munro et al. 2004, astro-ph/0412492*

Credit: NASA/CXC/UCLA/M. Munro et al.