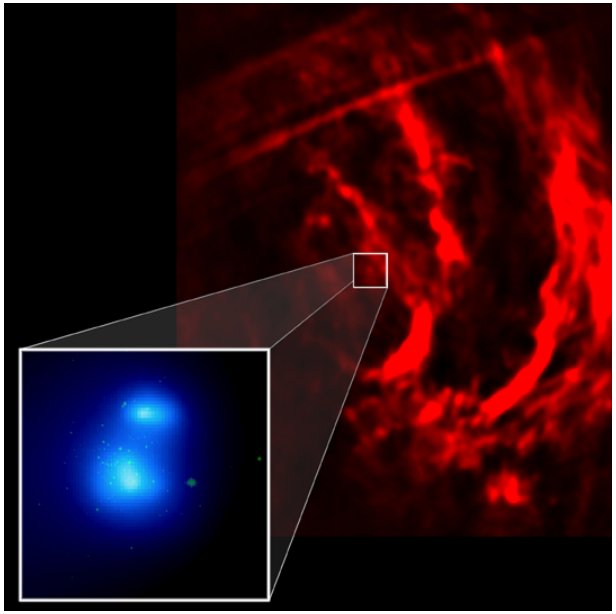
Chandra Science Highlights

The Arches Star Cluster: Chandra discovers cloud of hot gas in a dense star cluster near the center of our galaxy.



The Chandra observation of the Arches star cluster shows an envelope of 60 million degree gas around the star cluster. The X-ray data, shown as the diffuse blue emission in the inset box, overlays a Hubble Space Telescope infrared image of the same region, in which some of the individual stars in the cluster can be seen as point-like sources. Both the X-ray and infrared observations are shown in context of the spectacular radio filaments displayed in red.

Credit: X-ray: NASA/CXC/Northwestern/F. Zadeh et al.,
IR: NASA/HST/NICMOS, Radio NRAO/VLA/C. Lang

Chandra X-ray Observatory ACIS image.

Scale: Inset box of X-ray and IR (blue): 0.6 arcmin on each side. Background red radio: 8 arcmin across by 9.6 arcmin top to bottom.

- Luminosity of gas is greater than the total luminosity of individual stellar coronas in the star cluster.
- High temperature of X-ray emitting gas suggests that it is produced by collisions of stellar winds from the >100 O-type stars with masses greater than 20 solar masses that are concentrated within a radius of one light year.
- Temperature of gas suggests that it is not confined to the star cluster. Hot gas escaping from this and other clusters may explain the diffuse hot gas observed in the galactic center region.
- The Arches cluster could be a galactic analog for a process that is occurring on a much large scale in starburst galaxies, i.e. galaxies in which stars are forming at an unusually rapid rate.

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