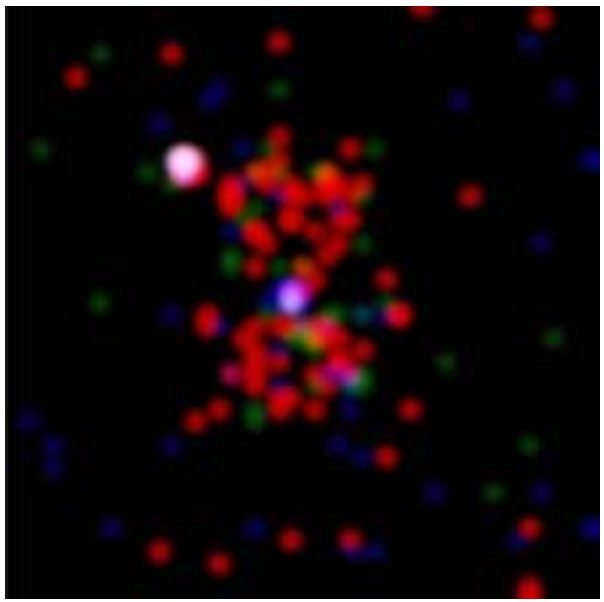
Chandra Science Highlights

3C294: A Cluster of Galaxies 10 billion light Years from Earth



Scale: Image is 1.2 arcmin per side

Using Chandra, astronomers have found the most distant cluster of galaxies ever detected in X-rays. Chandra's image reveals an hourglass-shaped region of X-ray emission (red: 0.5-1 keV; green: 1-2 keV; blue: 2-5 keV) extending outward for some 100 kpc from the previously known central radio sources (bright blue dot at center). The bright source on the upper left is probably a serendipitous foreground or background source.

Credit: NASA/IoA/A. Fabian et al.

Chandra X-ray Observatory ACIS Image

Ref: A. Fabian et al. 2001, "Chandra detection of the intracluster medium around 3C294 at z = 1.786" Mon. Not. Roy. Astr. Soc. (in press).

- From the optically determined red-shift z = 1.786, 3C294 is 40 percent farther than the next most distant X-ray galaxy cluster.
- Diffuse X-ray emission extends well beyond the radio source.
- Temperature of diffuse cluster gas - 5 keV.
- Luminosity of cluster X-ray emissions ~4.5 x 10^{44} erg/s.
- Radio core is detected as an X-ray source with a luminosity L ~ 10^{45} erg/s.
- Unusual hour-glass morphology of X-ray source is roughly aligned with Ly-alpha emission associated with the radio galaxy.
- The existence of such a cluster is consistent with a low-density universe.

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