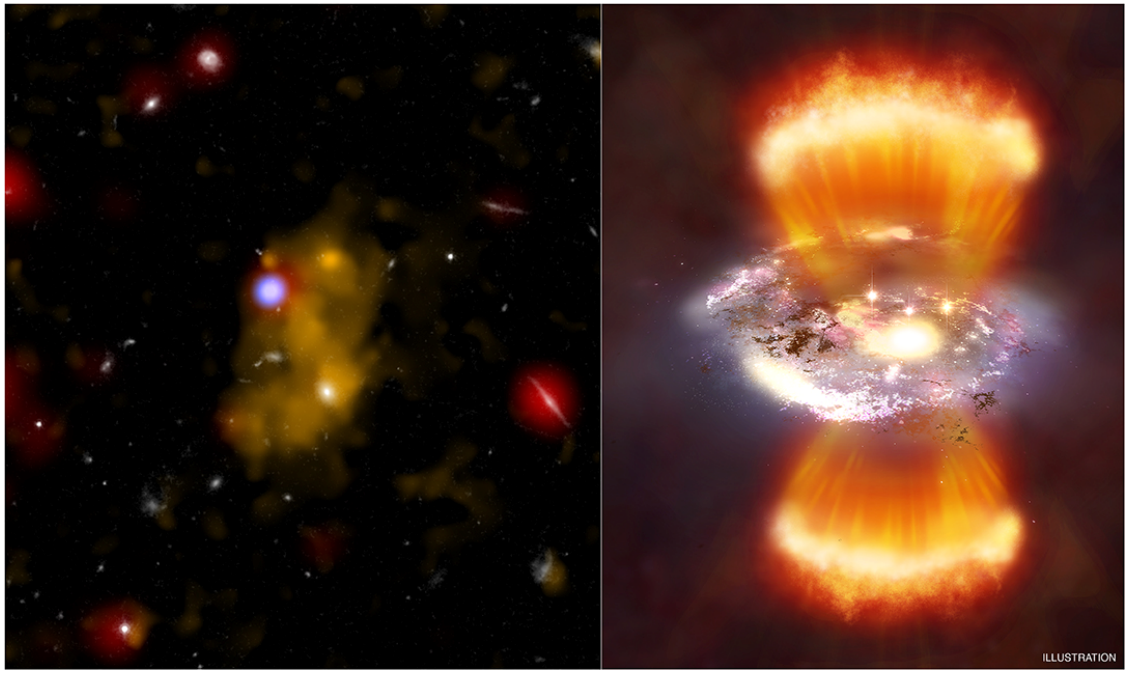
Chandra Science Highlight

Lyman Alpha Blobs: Galaxies Coming of Age



Chandra X-ray Observatory ACIS image
Left panel is 38 arc seconds across

Distance estimated: About 11.5 billion light years

The composite image shows the optical image of an immense gas cloud known as a Lyman-alpha blob (yellow), optical (white) and infrared (red) image of a galaxy located in the blob and an X-ray point source (blue) which is evidence for a growing supermassive black hole in the center of the galaxy. The artist's representation on the right shows what one of the galaxies inside a blob might look like if viewed at a relatively close distance.

Credit: Left Panel: X-ray (NASA/CXC/Durham Univ./D. Alexander et al.); Optical (NASA/ESA/STScI/IoA/S.Chapman et al.); Lyman-alpha Optical (NAOJ/Subaru/Tohoku Univ./T.Hayashino et al.); Infrared (NASA/JPL-Caltech/Durham Univ./J.Geach et al.): Right, Illustration: NASA/CXC/M.Weiss

Reference: J. Geach et al. 2009, Astrophys.J. 700, 1

- Lyman-alpha blobs are immense clouds of hydrogen gas radiating predominantly Lyman-alpha radiation, and observed in the vicinity of a distant galaxy.
- Because of the great distance (billions of light years) of the Lyman –alpha blobs, the Lyman-alpha radiation has been shifted into optical or infrared wavelengths by the cosmological red shift.
- A Chandra survey of 29 Lyman alpha blobs in a proto galaxy cluster revealed luminous X-ray emission from the central regions of 5 of these galaxies. This is thought to be a lower limit on the number of such sources.
- These results indicate that the energy output generated by central supermassive black holes is capable of heating the Lyman alpha blobs, and may limit the growth of galaxies.

CXC operated for NASA by the Smithsonian Astrophysical Observatory

June 2009