



**Chandra X-ray  
Observatory Center**

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**Submillimeter Galaxies in the Chandra Deep Field-North (SMG 123616.1+621513):** Merging submillimeter galaxies observed in the Chandra Deep Field-North at a distance of 11 billion light years. (Credit: X-ray: NASA/CXC/IoA/D.Alexander et al.; Illustration: CXC/M.Weiss)

**Caption:** An artist's illustration shows two young galaxies in the process of merging. The merger has triggered a prodigious burst of star formation and is providing fuel for the growth of the galaxies' central supermassive black holes. The inset shows a Chandra image of two central black holes in merging galaxies. Although the black holes appear to be very close in this image, they are actually about 70,000 light years apart. The different colors in the image are due to differences in X-ray absorption by gas and dust around the black holes with blue indicating more absorption than red. Observations indicate that many adolescent merging galaxies and their central black holes underwent a phenomenal spurt of growth 10 billion to 12 billion years ago. This growth spurt may have set the stage for the appearance of quasars, distant galaxies that contain the largest and most active black holes in the Universe.

**Scale:** Inset is 1 arcmin per side.

*Chandra X-ray Observatory ACIS Image*

*CXC operated for NASA by the Smithsonian Astrophysical Observatory*