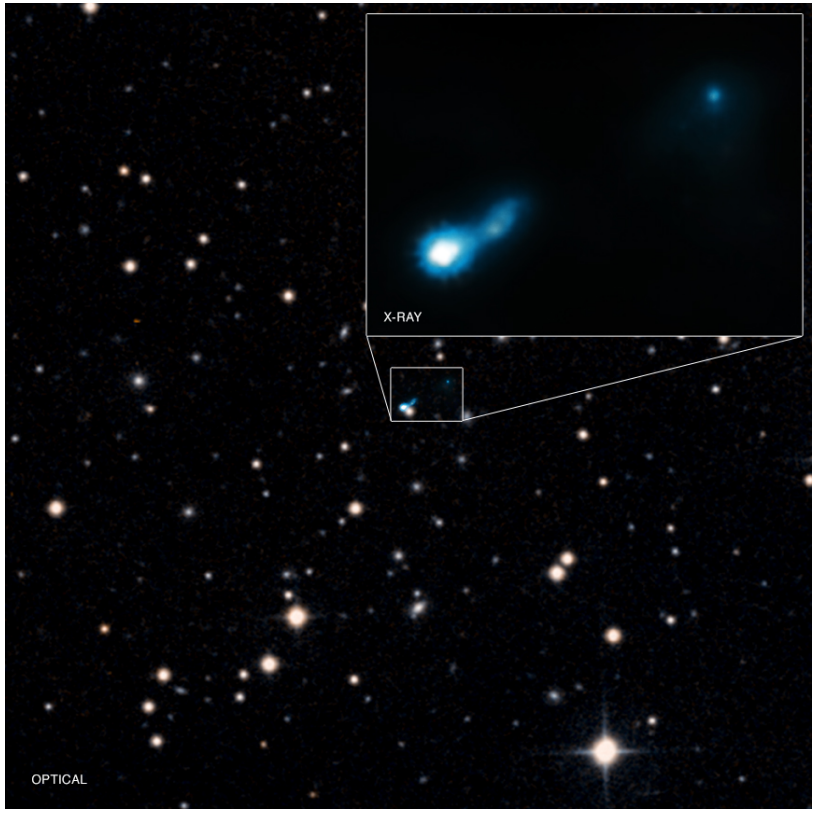
Chandra Science Highlight

B3 0727+409: Serendipitous Discovery of Distant Black Hole Jet



The main panel shows Chandra X-ray (blue) and Digitized Sky Survey optical (red, green, blue) data. Note that the bright optical source near the center of the image is a foreground galaxy. The inset shows the X-ray emission from the jet in more detail.

- ❑ This distant jet was discovered serendipitously when Chandra observed a foreground galaxy cluster.
- ❑ The light from this jet, which is at least 300,000 light years in length, was emitted just 2.7 billion light years after the Big Bang, when the Universe was only one-fifth its current age.
- ❑ Jets formed in the early Universe provide a probe of the growth of black holes at a very early epoch.
- ❑ The jet is unusual in that it is discovered by X-ray rather than radio observations. Jets are usually strong radio-emitters, whereas this one is not, and this discovery may signal the existence of an entire population of distant jets that have been missed by radio surveys.

Scale:
Main image is 10 arcmin across (16 million light years); Inset image is 46 arcsec across (1.23 million light years)

Distance Estimate:
11 billion light years (Redshift z = 2.5)

Reference: Simionescu, A. et al, 2015, ApJ, 816, 15; arXiv:1509.04822

Credit: X-ray: NASA/CXC/ISAS/A.Simionescu et al, Optical: DSS

Instrument: ACIS

CXC Operated for NASA by the Smithsonian Astrophysical Observatory

February 2016