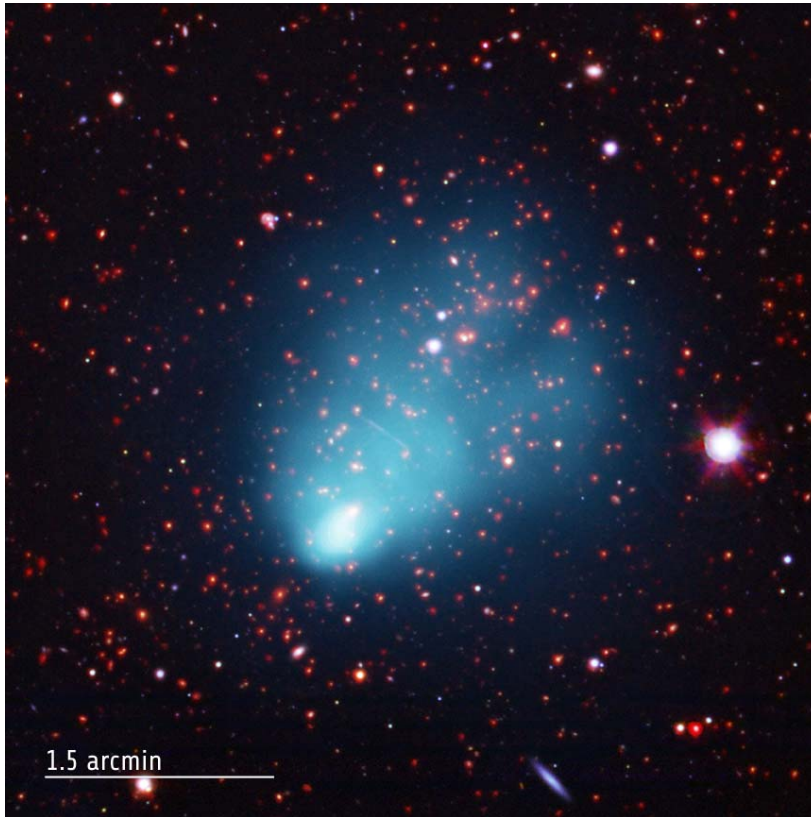




# Chandra Science Highlight

## El Gordo (ACT-CL J0102-4915): The Largest Known Galaxy Cluster in the Early Universe

Chandra X-ray Observatory ACIS image



Distance Estimate: about 7.2 billion light years ( $z=0.870$ )  
Scale: Image is 5.3 arcmin across (8 million light years across)

A composite image shows El Gordo in X-ray light from NASA's Chandra X-ray Observatory in blue, along with optical data from the European Southern Observatory's Very Large Telescope (VLT) in red, green, and blue, and infrared emission from the NASA's Spitzer Space Telescope in red and orange.

- El Gordo, the most massive known cluster in the early universe, was discovered using Chandra and observations at submillimeter wavelengths with the Atacama Cosmology Telescope in Chile.
- With an estimated mass  $\sim 2$  quadrillion solar masses, El Gordo is the most massive known cluster at a distance greater than 7 billion light years,
- Astronomers think that clusters began forming about 9 billion years ago, so El Gordo is seen as it was at a age of only a few billion years.
- The cometary appearance of El Gordo, including two "tails" extending to the upper right of the image, along with the VLT's optical data, indicate that El Gordo is the site of two galaxy clusters running into one another at a speed of a thousand km/s or greater.

Credit: X-ray: NASA/CXC/Rutgers/J. Hughes et al., Optical: ESO/VLT/Pontificia Universidad. Catolica de Chili/L.Infante & SOAR (MSU/NOAO/UNC/CNpq-Brazil)/Rutgers/F.Menanteau, IR: NASA/JPL/Rutgers/F.Menanteau

Reference: Menanteau, F. et al, 2011 ApJ (accepted); arXiv:1109.095