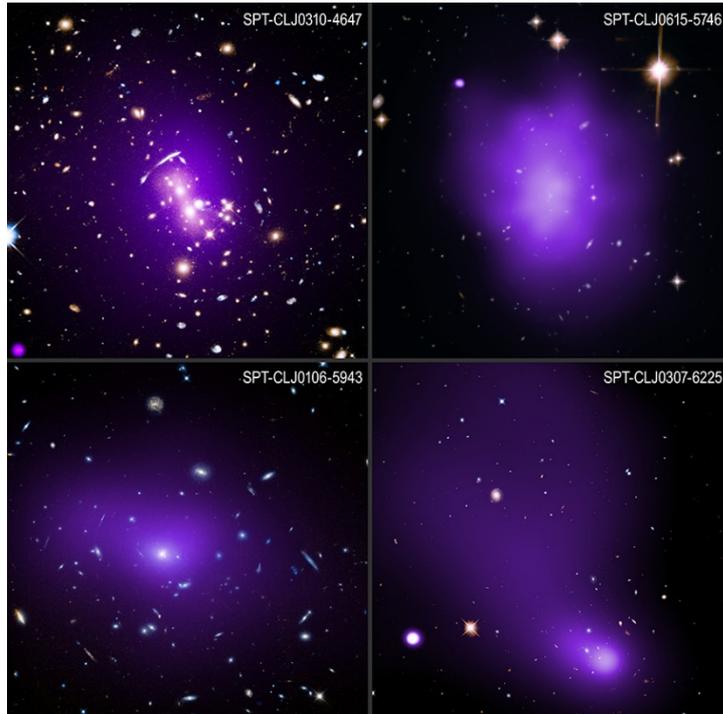




# Chandra Science Highlight

## Astronomers Find Spark of Star Birth Across Billions of Years



*In the four galaxy cluster images in this graphic, X-rays from hot gas detected by Chandra are in purple and optical data from NASA's Hubble Space Telescope, mostly showing galaxies in the clusters, are yellow and cyan. The galaxy clusters are located at distances of 3.9 billion, 5.6 billion, 6.4 billion and 7.7 billion light-years from Earth. In SPT-CLJ0307-6225 the brightest cluster galaxy is near the bottom right of the image and in the other images they are near the centers. Some of the long, narrow features are caused by gravitational lensing.*

- Astronomers have identified the main driver of star formation over the last 10 billion years in some of the universe's largest galaxies. This research was made using NASA's Chandra X-ray Observatory and several other telescopes.
- They studied the largest galaxies in the centers of 95 galaxy clusters at distances up to 9.9 billion light-years from Earth. These galaxy clusters are themselves some of the brightest and most massive known.
- Remarkably the primary factor in vigorous stellar birth in these galaxies is simply whether vast amounts of hot gas can cool off quickly enough.
- This factor has been unchanged over the period studied despite galaxy collisions being much more common 10 billion years ago, and the rates of star formation and the growth of supermassive black holes being much higher.

**Distance estimate:** Ranging from 3.4 billion to 9.9 billion light-years for the full sample.

**Credits:** X-ray: NASA/CXC/MIT/M. Calzadilla et al.; Optical: NASA/ESA/STScI; Image Processing: NASA/CXC/SAO/N. Wolk & J. Major

**Instrument:** ACIS

**Reference:** Calzadilla, M. et al., 2023, ApJ, Submitted; [arXiv:2311.00396](https://arxiv.org/abs/2311.00396)

**More information:** <https://chandra.si.edu/photo/2024/bcgs/>

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