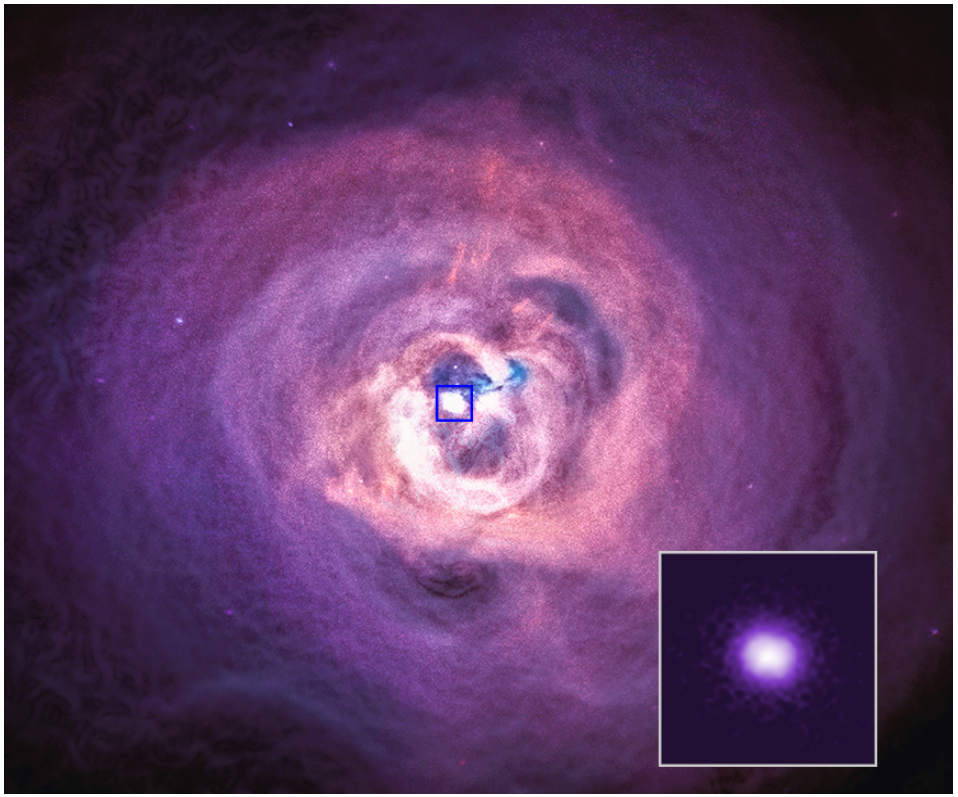
Chandra Science Highlight '

Chandra Data Tests “Theory of Everything”



Caption: Astronomers used Chandra to look for extraordinarily low mass “axion-like particles” in the Perseus galaxy cluster. A Chandra observation lasting over five days of the central supermassive black hole in the center of Perseus (insert) showed no evidence for certain axion-like particles, which some theorists think can explain dark matter.

- Astronomers used Chandra to perform a test of string theory, a possible “theory of everything” that would tie all of known physics together.
- The researchers were looking for a type of particle known as an “axion-like particle”.
- Galaxy clusters with their large-scale magnetic fields and luminous, embedded X-ray sources are excellent places to search for evidence for axion-like particles.
- The team looked at the Perseus galaxy cluster for over 5 days with Chandra, but did not find signals of any axion-like particles. The lack of detection in these Chandra observations helps rule out some versions of string theory.

Distance estimate: About 240 million light years.

Scale: Main image is about 8 arcmin (550,000 light years) across. The inset image is about 11 arcsec (13,000 light years) across.

Credit: NASA/CXC/Univ. of Cambridge/C. Reynolds et al.

Instrument: ACIS

Reference: Reynolds, C. et al., 2020, ApJ, 890, 59; arXiv:1907.05475

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