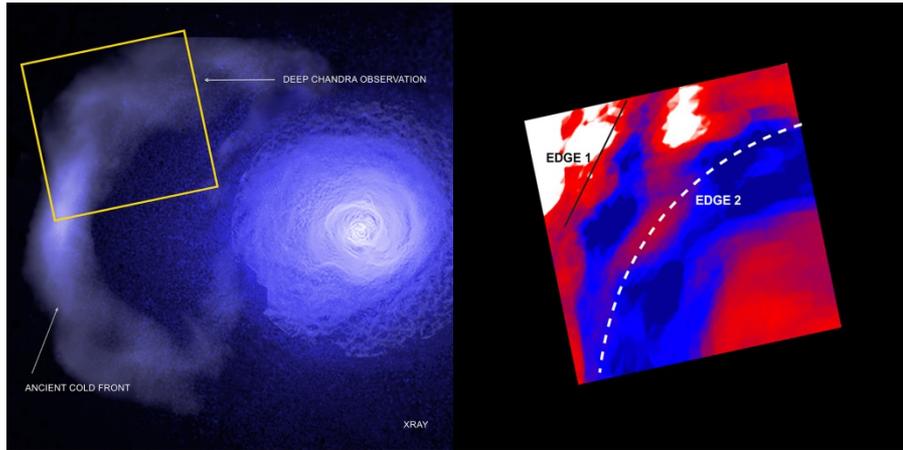




# Chandra Science Highlight

## Ancient Cold Front in the Perseus Cluster of Galaxies



Caption: Left: Composite broad band X-ray image of the Perseus cluster using Chandra data for the inner region of the cluster and XMM-Newton plus ROSAT data for the outer region. Right: Chandra image of the region of the cluster outlined by the box in the image on the left.

Distance estimate: 250 million light years

Image scale: Image on the left is 42 arcmin (about 3 million light years) across. Image on the right is about 1.25 million light years across.

- At a temperature of 30 million K (blue in image on the right), the cold front is far from cold in an absolute sense, but is cold compared to the surrounding gas, which has a temperature of 80 million K (red in image on the right).
- The cold front, likely triggered when a smaller galaxy cluster fell into the cluster, is about two million light years long and has traveled away from the center of the cluster at about 300,000 miles per hour for about 5 billion years.
- The front has remained remarkably narrow over the course of its epic journey, probably due to the stabilizing effect of an intergalactic magnetic field.
- The Chandra image on the right shows a region of the cluster where this stabilizing effect may have weakened, leading to the development of a “hook” protruding from the front (the blue filament between the dotted and solid lines in the inset).

Credit: NASA/CXC/GSFC/S.Walker, ESA/XMM, ESA/ROSAT

Instrument: ACIS

Reference: S. Walker et al. 2018 Nature Astronomy, arXiv:1803.00898

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