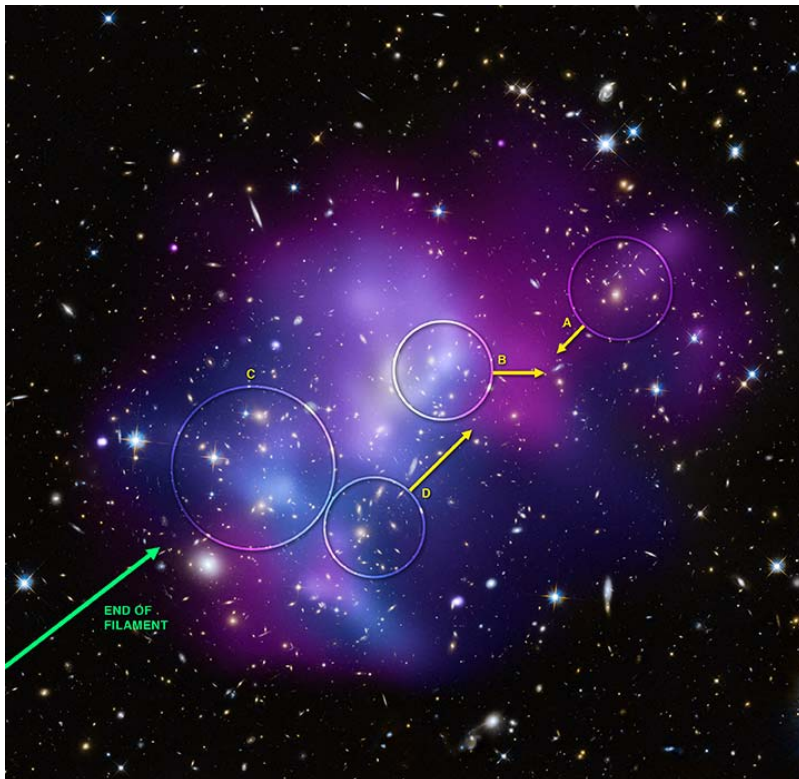




Chandra Science Highlight

MACSJ0717.5+3745: Merging Massive Galaxy Clusters

Chandra X-ray Observatory ACIS image



Scale: Image is 4.5 arcmin across.

Estimated Distance: 5.4 billion light years

This composite image shows a major cluster merger involving four separate galaxy clusters. Hot gas is shown in an image from NASA's Chandra X-ray Observatory and galaxies are shown in an optical image from NASA's Hubble Space Telescope. The hot gas is color-coded to show temperature. The coolest gas is shown as reddish purple, the hottest gas is blue, and the temperatures in between are purple. The labels show the galaxies in the four different clusters involved in the collision, and the direction of motion for the three fastest moving clusters. The length of the arrow shows the approximate speed in a direction perpendicular to the line of sight.

- The repeated mergers in MACSJ0717 are caused by a 13-million-light-year-long stream of galaxies, gas, and dark matter – known as a filament – pouring into a region where the mergers are occurring.
- The direction of motion of the clusters is roughly parallel to the direction of the filament. Data from Keck Observatory was used to derive the speed of the clusters along the line of sight, allowing the three-dimensional geometry and dynamics of MACSJ0717 to be derived.
- Cluster C is likely the core of the main cluster.
- The large region of relatively hot gas (shown in blue) that extends from the left side of cluster C to the right side of region D may be caused by heating as significant quantities of gas from the filament plough into the main cluster.

Credit: X-ray (NASA/CXC/IfA/C. Ma et al.); Optical (NASA/STScI/IfA/C. Ma et al.)

Reference: C. Ma et al. 2009, *Astrophys. J.* 693, L56

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