



X-RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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Chandra observations of the AS0295 cluster

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Mergers between clusters of galaxies are highly energetic events capable of drastically changing the observed properties of clusters. Therefore, merging events provide a unique set-up for the study of cluster physics and the behavior of the interaction between gas, stars and dark matter.

We present the results of the X-ray analysis of the AS0295 cluster, a low redshift ($z=0.3$), massive cluster caught in the process of merging. Chandra X-ray images show a disturbed morphology, with X-ray emission elongated in the SE-NW direction. While the secondary cluster has a clearly visible X-ray peak and cool gas (~ 6 keV) associated with it, the primary has a flatter surface brightness distribution and a high temperature (~ 9.5 keV), similar to the mean temperature of AS0295.

We detected several merging signatures, such as a cold front close to the secondary's core, a plume of cool gas emerging from primary cluster and two possible shocks: one in the vicinity of primary and the other leading the secondary.

Comparing the X-ray information with literature results of binary merger simulations, we discuss the dynamical state of AS0295. Moreover, published optical and radio studies of this cluster show the presence of an offset between gas and dark matter in the primary cluster and radio emission associated with this system. Having all this complementary information about AS0295 cluster, we show that this system represents a promising candidate for the understanding of the process of cluster merging and the nature of dark matter.

Topic

Hot and diffuse baryons

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