



X-RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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Merging in the Coma Cluster - Slingshot Tails and Runaway Shocks

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We describe the merger of the NGC 4839 group with the Coma cluster using X-ray observations from the XMM-Newton and Chandra Observatories (Lyskova et al. 2019). X-ray data show two prominent features: (i) a long (600 kpc in projection), bent tail of cool gas trailing (towards the south-west) the optical center of NGC 4839, and ii) a 'sheath' region of enhanced X-ray surface brightness enveloping the group, which is due to hotter gas. We argue that a post-merger scenario provides a consistent explanation of the observed features. In this scenario a slingshot tail (Sheardown et al. 2019) is formed when the group, initially moving to the south-west, reverses its radial velocity after crossing the apocenter. The ram pressure ceases and the ram-pressure-displaced gas falls toward the center of the group (to the south west, away from the Coma cluster center) and overshoots the group center. Shortly after apocenter passage, the optical galaxy, dark matter and gaseous core are moving to the north-east, while the displaced gas continues moving to the south-west. In this scenario, the shock, driven by the group before reaching apocenter, has detached from the group and would be located close to the famous relic to the south-west of the Coma cluster. Such "runaway" shocks can survive in cluster outskirts where the density profile is sufficiently steep (Zhang et al. 2019).

Topic

Hot and diffuse baryons

Affiliation

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