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Titulo: X-ray study of the double radio relic merger cluster Abell 3376 with Suzaku

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Resumen:

Galaxy clusters are the largest virialised structures in the Universe, which form and grow by accretion and merging with galaxies and sub-clusters. During these processes large-scale shocks can be produced, which are associated with diffuse radio structures known as radio relics. The shocks may accelerate electrons up to relativistic energies (Bell 1978; Blandford & Eichler 1987). These relativistic electrons generate radio emission through synchrotron radiation. However, not all the radio emission present in the merger cluster originates from synchrotron emission. The correlation between X-ray shocks and radio relics is still not well understood. Many earlier X-ray studies suffer from limited signal-to-noise around relics Therefore, there are (almost) no deep analyses of the spatial distribution of shock fronts in X-rays associated to radio relics. In this work, we present the X-ray analysis of the nearby double relic cluster Abell 3376, observed with Suzaku XIS. These deep observations cover the entire relic region in the outskirts of the cluster. They allow us to investigate the spatial differences between radio (non-thermal) and X-ray (thermal) components of the plasma. By comparing the properties of the radio and shock heated plasma, we estimate the dynamical age of the shock front. Their spatial distribution tells us how shocks propagate and heat the intercluster medium (ICM). The previous study of Akamatsu et al. 2012 (Publ. Astron. Soc. Jpn., 64) about the western relic shows the presence of a discontinuity in the ICM temperature and surface brightness profiles (meaning the pressure discontinuity), which is a clear evidence of a shock front. The present analysis aims to improve these results by adding the most recent measurements of the eastern radio relic. It provides us with a better understanding of the dynamical state of the gas during a merger scenario.