T04a Mapping Sloshing Structures in the Perseus Cluster with XRISM Xtend

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Galaxy clusters grow through repeated mergers and collisions with other clusters and groups. In this process, the cluster core can oscillate, disturbing the hot intracluster medium and forming spiral structures—a phenomenon known as sloshing. These motions are expected to produce discontinuities in surface brightness, temperature, and metal abundance around the spiral features. Among such systems, the Perseus cluster is an ideal target for studying sloshing, as it exhibits a clearly confirmed spiral structure and extensive observations.

We analyzed the Perseus cluster using Xtend, a wide-field CCD camera onboard XRISM with a field of view of $38' \times 38'$. Multiple Xtend observations of Perseus have provided a total exposure of $\sim$ 613 ks with good photon statistics. Xtend' s field of view covers a wide area extending from the brightest cluster galaxy (BCG) out to approximately $40'$, which includes not only the central spiral structures but also the outer, older sloshing features. To validate the reliability of Xtend' s effective area calibration, we compared its normalizations with those of XMM-Newton. From these data, we derived wide-field maps of surface brightness, temperature, and metal abundance in the Perseus cluster. These maps reveal spatial asymmetries likely associated with sloshing, demonstrating Xtend' s capability to probe large-scale thermodynamic structures and offering new insights into the dynamical evolution of the ICM.