

Z217r XRISM observations of galaxy clusters during performance verification phase

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Resolve, on board the X-ray Imaging and Spectroscopy Mission (XRISM), has provided new insights into the complex structure of galaxy clusters with its high energy resolution of < 5 eV at 6 keV, while Xtend has a large field of view of $38' \times 38'$ and can observe up to the cluster outskirts. In particular, a number of interesting structures have been observed in galaxy cluster centers as evidence of gas motion in the intracluster medium (ICM). Not only can it observe gas turbulence in the cluster center with an accuracy of ~ 10 km/sec, as revealed by the SXS on board the Hitomi satellite, but Resolve can also accurately determine the bulk motion of the ICM using redshifts within an accuracy of a few tens of km/sec in line of sight due to its high accuracy on the absolute energy scale. The high sensitivity of Resolve allows emission lines from many ions to be detected, which is advantageous not only for accurately determining the abundance of elements, but also for analyzing the temperature structure of the ICM.

The XRISM has observed several nearby bright galaxy clusters during the performance verification phase, including the Perseus and Centaurus clusters. Although the Resolve gate valve has not yet been opened and observations are limited to spectra above 2 keV, the structure of the ICM near the cluster centers, especially near the brightest cluster galaxies (BCGs), including the interaction between the ICM and BCGs, is becoming clearer. I will discuss the structure of galaxy clusters using high-resolution spectroscopic observations and report the initial results of galaxy clusters observed during the PV phase using Resolve and Xtend.