X-ray Scaling Laws for Galaxy Clusters and Groups

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Abstract

Scaling laws between galaxy cluster properties, such as the x-ray luminosity-temperature relation (L–T), the total mass-temperature relation (M–T), and velocity dispersion temperature relation (σ–T) reflect the underlying physics in cluster formation and evolution. The differences between empirically determined and theoretically predicted scaling laws can give useful insights into physical processes happening in clusters. To determine these scaling laws, we have developed a data reduction pipeline for clusters observed by the ASCA x-ray satellite to create a sample of 273 clusters and groups with measured x-ray luminosities, average temperatures, and metal abundances. This is the largest such sample yet created and will form a baseline for future studies with improved instruments like Chandra and XMM-Newton.

CATEGORY: CLUSTERS OF GALAXIES