

T12b **Chandra Observational Constraints on the X-ray Mass-Temperature Relation of Galaxy Clusters and Groups out to $z \sim 1.4$**

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Mass-temperature relation of galaxy clusters and groups is an important indicator for examining our understanding of the evolution and thermal history of such systems. We present a systematic analysis on the largest sample so far, which consists of more than 300 clusters and groups from the Chandra archival data. We show that the mass-temperature relation of the high- and low-mass parts of the sample can be described with power-law relations with different slopes. We also find that there is a clear trend for cooler systems to have a smaller mass fraction of X-ray emitting gas, which is evident within both r_{500} and r_{200} . Both phenomena demonstrate that the effects of energy injection are more pronounced in less massive (i.e., cooler) systems.