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Cosmological constraints from the Chandra-Planck galaxy cluster sample

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“Galaxy clusters are a powerful cosmological probe: they track the most recent evolution of large scale structure and therefore are fundamental for testing the cosmological model in the recent Universe.

To compare the observations of galaxy clusters with theoretical predictions and thus constrain the cosmological parameters of the underlying model, precise knowledge of cluster masses and redshifts is required.

Scaling relations between the cluster masses and observables (like the richness in optical wavelength, Y_{SZ} in the mm-band or Y_X in X-rays) are usually used to compute the mass of clusters.

We provide a new scaling relation using a sample of clusters from the Planck Early Sunyaev-Zeldovich catalogue that was observed in X-rays by Chandra, and compare it to the results of the Planck collaboration obtained from XMM-Newton observations of a subsample of the ESZ.

We calibrate a mass bias for a subset of the Planck cosmological cluster sample with a novel method we propose to account for selection effects, using published weak-lensing data from the Canadian Cluster Cosmology Project (CCCP) and Multi Epoch Nearby Cluster Survey (MENeCS). Applying this new bias parameter to the full Planck cosmological cluster sample, we obtain new constraints on the cosmological parameters.”

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