

ASTROPHYSICS SEMINAR

Wednesday, 4 November 2015 at 11:00

Modeling the gas content in groups and clusters from the Sunyaev-Zel'dovich effect angular power spectrum

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Abstract. The angular power spectrum of the thermal Sunyaev-Zel'dovich (tSZ) effect is considered an effective tool for constraining cosmology due to its sensitivity on key cosmological parameters like the normalization of the matter power spectrum. Conversely, if the relevant cosmological parameters are known from other probes, the tSZ power can be used as a powerful probe to investigate the gas distribution inside galaxy groups and clusters out to the redshift of their formation. In our work we explore the latter path to set meaningful constraints on the extent of non self-similar evolution in the cluster gas distribution using GNFV pressure models. The tSZ power takes its contribution from groups and clusters of all masses in the universe, and has particularly strong dependence on the high- z , low mass systems which are difficult to probe directly. Using SPT measured values of the CMB bandpowers we model the impact of non-standard scenarios like a redshift dependent gas-mass fraction or a changing ratio of cool core to non-cool core clusters on the tSZ power. We construct X-ray scaling relations from our results and compare them with recent publications to highlight some possible selection effects in the X-ray. Finally, we use simulated bandpowers for a future SZ experiment on-board CCAT to show how its improved sensitivity and angular resolution can break parameter degeneracies to simultaneously constrain the shape and evolution of the gas distribution with high accuracy.

Additional Information

This seminar will be given in the ISDC "B01/container" room

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