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Probing masses of SZ-detected clusters using clustering signatures

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Abstract. We investigate the clustering of clusters detected by Planck via the Sunyaev-Zeldovich (SZ) effect. The bias (the offset of the clustering relative to what is expected for dark matter) is then used to estimate the average mass of clusters in the sample, using mass-bias relations found in simulations. We also compare the clustering of Planck clusters with those detected in the Sloan Digital Sky Survey (SDSS) using the GMBCG method. Our results indicate that Planck clusters have a higher average mass than that inferred from their SZ signatures.

Keywords. clustering, bias, correlation, etc.

The tension between (Ω_m, σ_8) constraints from primary CMB and those from SZ-clusters, as in Planck Collaboration XXIV, 2015, may indicate that masses of clusters are not correctly estimated. In this study we probe the masses of Planck clusters using their clustering signature. We measure the bias, b, given by the offset of the two-point correlation function of clusters, relative to that of dark matter in a ΛCDM model: $\xi_{clusters} = b^2 \xi_{DM}$. Using the relation between bias and halo mass given by Seljak & Warren (2004) we find that Planck clusters have a signficantly higher average mass than that inferred from the SZ effect. We are exploring other bias-mass relations and the impact of bias evolution and assembly bias on the estimated mass.

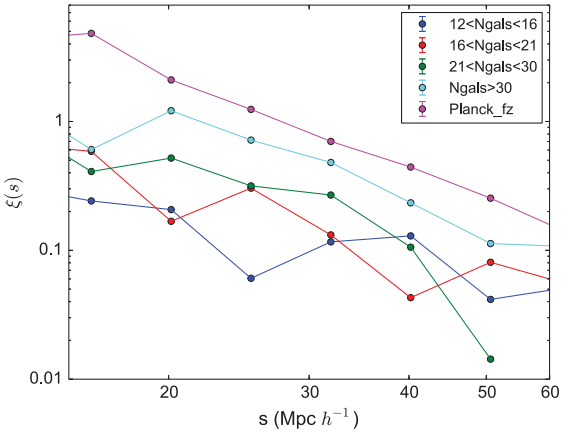

Figure 1. Clustering of Planck clusters (2015 Union catalog) and SDSS clusters split into four richness cuts (similar to cuts used by Sereno *et al.* 2015)

References

Planck Collaboration XXIV 2015, arXiv:1502.01597
Seljak, U. & Warren, M. 2004, *MNRAS* 355, 129
Sereno *et al.* 2015, *MNRAS* 449, 4147