

MEASURING THE DENSITY FLUCTUATION FROM THE CLUSTER GAS MASS FUNCTION

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We derive the gas mass function of clusters of galaxies to measure the density fluctuation spectrum on cluster scales. The baryon abundance confined in rich clusters is computed from the gas mass function and compared with the mean baryon density in the universe which is predicted by the BBN. This baryon fraction and the slope of the gas mass function put constraints on σ_8 and the slope of the fluctuation spectrum. Adopting the density parameter of baryons $\Omega_b h^2 = 0.0175 \pm 0.0075$ and assuming that $\sigma(r) \propto r^{-\frac{3+n}{2}}$, we find $(\sigma_8, n) = (0.70^{+0.24}_{-0.10}, -1.5^{+1.1}_{-0.5})$ for $h = 0.7 \pm 0.1$. Our value of σ_8 is independent of Ω_0 and thus we can estimate Ω_0 by combining σ_8 obtained in this study with those from Ω_0 -dependent analyses to date. Constraints are also derived for CDM and CHDM models.

References

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