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The effect of clustering dark energy on cosmological parameter estimation

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Clustering dark energy presents interesting phenomenology in comparison to standard homogeneous dark energy models. We investigate the impact of clustering dark energy on structure formation. Employing the spherical collapse formalism we obtain the collapse and virial density thresholds, as well as additional mass contributions due to non-linear dark energy perturbations. For an accurate description, the halo mass function is carefully recalibrated to include these non-linear effects of clustering dark energy. Using our MCMC likelihood analysis of X-ray cluster samples calibrated with weak gravitational lensing data together with standard cosmological data sets, we constrain cosmological parameters when incorporating these non-linear corrections. We emphasise the impact on the constraints of the cosmological parameters and the relevance of including these corrections in the cluster mass function calculation.

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