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The impact of relative baryon-CDM perturbations on the evolution of Large-Scale Structures

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Different evolution of the two dominant matter components of our Universe baryons and cold dark matter, due to the photon pressure before recombination, causes relative perturbations between the two fluids in the early Universe. These perturbations can be both in the density and peculiar velocity of the two fields and we call them relative baryon-CDM perturbations which are commonly neglected in the studies of structure formation. However, taking them in to account might become very important in the era of high precision cosmology. In this talk first I will explain these types of perturbations theoretically, using linear perturbation theory, then I will go through the fact that how can we assess the impact of these relative perturbations on halo's distributions performing 2-fluid gravity-only N-body simulations. We further measure the cross/auto power spectra and the associated bias term. Then I will move to presenting the impact of such perturbations on cosmic voids and the real-space two-point correlation function, in particular the baryonic acoustic oscillations peak position.

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