

Impact of light sterile neutrinos on cosmic structure formation

Sterile neutrinos with masses on the eV scale are promising candidates to account for the origin of neutrino mass and the reactor neutrino anomalies. The mixing between sterile and active neutrinos in the early universe could result in a large abundance of relic sterile neutrinos, which depends on not only their physical mass m_{phy} but also their degree of thermalization, characterized by the extra effective number of relativistic degrees of freedom ΔN_{eff} . Using neutrino-involved N-body simulations, we investigate the effects of sterile neutrinos on the matter power spectrum, halo pairwise velocity, and halo mass and velocity functions. We find that the presence of sterile neutrinos suppress the matter power spectrum and halo mass and velocity functions, but enhance the halo pairwise velocity. We also provide fitting formulae to quantify these effects.

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