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On the impact of 𝒇(𝒬) gravity on the Large Scale Structure

We investigate the exponential 𝒇(𝒬) symmetric teleparallel gravitation, namely 𝒇(𝒬) = 𝒬 + 𝒬𝒬_0(1 − 𝒬^(−𝒬√𝒬/𝒬_0)) using ME-GADGET code to probe the structure formation with box sizes 𝒬_box = 10/100 Mpc/h and middle resolution 𝒬^1/3 = 512. To reproduce viable cosmology within the aforementioned modified gravity theory, we first perform Markov Chain Monte Carlo (MCMC) sampling on OHD/BAO/Pantheon datasets and constrain a parameter space. Furthermore, we also derive theoretical values for deceleration parameter 𝒬(𝒬), statefinder pair {𝒬, 𝒬} and effective gravitational constant 𝒬eff, perform 𝒬𝒬(𝒬) diagnostics. While carrying out N-body+SPH simulations, we derive CDM+baryons overdensity/temperature/mean molecular weight fields, matter power spectrum (both 2/3D, with/without redshift space distortions), bispectrum, two-point correlation function and halo mass function. Results for small and big simulation box sizes are therefore properly compared, halo mass function is related to the Seth-Tormen theoretical prediction and matter power spectrum to the standard CAMB output.

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