The Effect of Baryons on Cosmic Structures

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The effect of baryons on cosmic structures is investigated combining high-resolution controlled N-body experiments with cosmological gasdynamical simulations of galaxies and clusters in the $\Lambda$CDM cosmology. In particular, I will discuss the vital role of baryons for crucial issues including the fate of supermassive black holes and the evolution of the M-$\sigma$ relation in galaxy mergers, the structural evolution of substructure in cold dark matter models, and the shapes of dark matter halos.