X04a **Re–examining the Too–Big–To–Fail Problem for Dark Matter Halos with Central Density Cores**

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According to the standard theory of galaxy formation, the most massive dark substructures of galaxies should also contain the brightest satellite galaxies, like classical dwarf spheroidal galaxies (dSphs). However, recent studies found the masses of dark matter (DM) subhalos which surround nearby dSphs to be significantly lower than those of the most massive subhalos expected around Milky Way sized galaxies in cosmological simulations (e.g., Boylan–Kolchin et al. 2011, 2012). This problem is the so called "too–big–to–fail" (TBTF) problem of cold dark matter cosmology.

A caveat of previous work has been that dark substructures were assumed to contain steep density cusps in the center of DM halos even though the central density structure of DM halos is still under debate. For example, Walker & Peñarrubia (2011) showed that DM halos of some dSphs prefer cored models to cuspy models. In this study, we re–examine the TBTF problem for models of DM density structure with cores or shallowed cusps. Our analysis demonstrates that the TBTF problem is alleviated as the inner slope of the central cusp becomes shallower. We also derive the critical inner slope of DM density profile required in order to solve the TBTF problem. This result provides suggestions for future observations.