# The small scale problems in the ΛCDM model

Antonino Del Popolo
*Università di Catania*

February 28th, 2014

**Abstract**

Despite the fact that the ΛCDM model is often referred to as "concordance model", to emphasize that its predictions are in agreement with current observations, both of the nearby universe and the early universe, some discrepancy with observations has emerged on scales from a few kpc to tens of pc. Examples of the quoted tension are: the missing satellite problem, the angular momentum catastrophe, the too big to fail problem, and the cusp/core problem. In this talk, I review the previous problems and discuss a "unified baryonic solution" to them. In particular, I discuss how a secondary infall model, taking into account the effect of ordered and random angular momentum, dynamical friction, and baryons adiabatic contraction, can reconcile the observations with the predictions of the ΛCDM model. Concerning the cusp/core problem, the interaction among dark matter and baryons through dynamical friction flattens the inner cusp of the density profiles. Applying to the Via Lactea 2 subhaloes a series of corrections (e.g., flattening of the density profiles of satellites before they are accreted to the main halo, correcting for the UV heating and tidal stripping), the number of massive, luminous satellites result in agreement with the number observed in the MW. The model also produces an angular momentum distribution in agreement with observations, namely the distribution of the angular spin parameter and angular momentum of the dwarfs studied by van den Bosch, Burkert, & Swaters (2001).