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Small scale frictions in the LCDM cosmology

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Dwarf galaxies are the lowest mass galaxies in the Universe but they are key laboratories for understanding galaxy formation processes, since their properties are sensitive to how these processes are in play. Moreover they are strong probes for cosmology and dark matter properties. There are long standing debates in the literature on whether the observed properties of dwarf galaxies are consistent with the predictions of the standard model of cosmology. In this overview, I will go over some of the key challenges of understanding dwarf galaxies in the cosmological context of galaxy formation, in particular “missing satellite”, the “too big to fail”, the “cusp vs core” problems. I will discuss how some of these historical “tensions” have been (or can be) addressed in recent cosmological simulations that include complex physics of galaxy formation.

Primary author: FATTAHI, Azadeh (Durham University)

Presenter: FATTAHI, Azadeh (Durham University)

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