

X43a The Missing Satellite Problem Outside of the Local Group

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The missing satellite problem is one of the major challenges to the widely accepted Λ CDM paradigm, which over-predicts the abundance of dwarf galaxies in the Local Group. Recent work suggests that the baryonic physics plays a key role, but one of the main issues here is that the problem has been tested only in the Local Group, which may not be a representative halo in the Universe. Motivated by this, we have started a project to address the problem using a statistical sample of nearby galaxies outside the Local Group.

We have observed several galaxies with mass similar to that of the Milky Way Galaxy with Hyper Suprime-Cam as a pilot program. We first select dwarf galaxies using their low surface brightness and then further visually inspect all the candidates to eliminate fake sources. We find that (1) the abundance of dwarf galaxies is smaller by a factor of two than the prediction from one of the current hydro-dynamical simulations and (2) there is a large halo to halo scatter. Our results highlight the importance of a statistical sample of nearby galaxies to address the missing satellite problem. We conclude with future prospects of the project.