An analytical model for the structure evolution of satellite galaxies in the Milky Way and its application to both Cold and Warm dark matter

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Studying the very inner structure of faint satellite galaxy in the Milky Way requires very high-resolution hydrodynamical simulations with realistic model for star formation, which are beginning to emerge only very recently. In this work we develop an analytical description to model the inner kinematic of galaxy and apply it to the MW satellites. Our aim is to investigate their constraints on the nature of dark matter, namely cold dark matter and warm dark matter. We use a Monte-Carlo method to produce merger trees of MW mass halos and a semi-analytical model to produce visible stars in the satellite galaxies. We consider a few important processes which can significantly affect the satellite kinematics. The first is the reduction of dark matter halo concentration in the warm dark matter model. The second is the baryonic feedback which will induce a flat inner profile with dependence on the star formation efficiency in the satellite galaxy. The third is the tidal stirring which can further reduce the satellite velocity dispersion. Using this model we can study the contribution of different baryonic process and set constraints on the WDM mass.