

Testing simple dark matter phase-space prediction methods on cosmological hydro-dynamical simulations of Milky-Way-like galaxies

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Abstract content

In the framework of zoom-in cosmological simulations published in Mollitor et al 2015, together with news runs, we compare the phase-space distributions of simulations of Milky Way like Halos with those inferred by the Eddington inversion. This method as presented by Lacroix et al 2018 is able to deduce the phase-space distribution of Dark Matter (DM) at different radii from the mass density distributions of the different components of the target halo i.e. DM, Gas and Stars. We therefore compare the results of the Eddington inversion applied on the different objects, with its velocity distribution in both DM-Only and hydro runs. The comparisons are made within the framework of the spherical formalism and taking into account the velocity anisotropy. For the sake of consistency, we also compare the spherically averaged reconstructed gravitational potential used in the method with the true 3D potential of the simulations. Uncertainties of the method and results are discussed. We aim to assess the validity of the mentioned method as an alternative to the benchmark model used to predict the local DM phase-space properties. Consequences for direct and indirect DM detection are quantified through relevant quantities like moments of the speed distributions and the DM relative velocity. Soon on arxiv.

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