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Jeans Model Beyond Spherical Symmetry

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The isothermal Jeans model is a semi-analytical approach to modelling galaxies and galaxy clusters with self-interacting dark matter (SIDM) that has been shown to work remarkably well. Recent studies have found great success testing Jeans model predictions for SIDM halos against both observations and simulations while assuming spherical symmetry. In the presence of baryons SIDM halos are known to depart from spherical symmetry, therefore we present a theoretical framework for relaxing symmetry assumptions and extending the Jeans model to higher dimensions. We confront 2D Jeans model predictions to SIDM-plus-baryons simulations of halos with a (velocity-independent) cross-section of $\sigma/m \sim 1\ cm^2/g$, showing that the model predicts the correct order of magnitude for the cross-section as well as matching halo shape observables in the intermediate region where the effects of SIDM become dominant.

Collaboration name

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