



Contribution ID: 432

Type: **Parallel Talk**

Constraints on dark matter self-interaction from the galactic core sizes.

Friday, 8 July 2022 10:15 (15 minutes)

Self-interaction of particulate dark matter may help thermalising the galactic center and driving core formation. The core radius is expectedly sensitive to the self-interaction strength of dark matter. In this work we study the feasibility of constraining dark matter self-interaction from the distribution of core radius in isolated haloes. We perform systematic N -body simulations of isolated galactic haloes in the mass range of 10^{10} - $10^{15} M_{\odot}$, incorporating the impact of dark matter self-interaction, having an interaction strength σ/m in the range of $(0 - 10) \text{ cm}^2/\text{gm}$. With zero scattering cross-section signifying the collision-less cold dark matter scenario. Comparing the simulated dark matter density profiles with the observational data from dwarf galaxies, low surface brightness galaxies and galaxy clusters, we provide a conservative upper limit on the self-interaction cross-section, $\sigma/m < 9.8 \text{ cm}^2/\text{gm}$ at 95% confidence. We also report significant dependence of the derived bounds on the galactic density distribution models assumed for the analysis.

In-person participation

Yes

Primary author: SARKAR, Sambo (Department of Physics, Indian Institute of Technology Kharagpur)

Co-authors: Mr SHAW, Abinash Kumar (Astrophysics Research Centre, Open University of Israel); Dr RAY, Tirtha Sankar (Department of Physics, Indian Institute of Technology Kharagpur)

Presenter: SARKAR, Sambo (Department of Physics, Indian Institute of Technology Kharagpur)

Session Classification: Astroparticle Physics and Cosmology

Track Classification: Astroparticle Physics and Cosmology