Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **3660** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) The local dark matter distribution in self-interacting dark matter halos

Wednesday 21 June 2023 11:30 (15 minutes)

We study the effects of dark matter self-interactions on the local dark matter distribution in selected Milky Way-like galaxies in the EAGLE hydrodynamical simulations. The simulations were run with two different self-interacting dark matter models, a constant and velocity-dependent self-interaction cross-section. We find that the local dark matter velocity distribution of the Milky Way-like halos in the simulations with dark matter self- interactions and baryons are generally similar to those extracted from cold collisionless dark matter simulations with baryons. In both cases, the local dark matter speed distributions agree well with their best fit Maxwellian distributions. Including baryons in the simulations with or without dark matter self-interactions increases the local dark matter density and shifts the dark matter speed distributions to higher speeds. To study the implications for direct detection, we compute the dark matter halo integrals obtained directly from the simulations and compare them to those obtained from the best fit Maxwellian velocity distribution. We find that a Maxwellian distribution provides a good fit to the halo integrals of most halos, without any significant difference between the results of different dark matter self-interaction models.

Keyword-1

dark matter simulations

Keyword-2

dark matter experiments

Keyword-3

dark matter theory

Primary authors: ROBERTSON, Andrew; RAHIMI, Elham; VIENNEAU, Evan; BOZORGNIA, Nassim

Presenter: VIENNEAU, Evan

Session Classification: (PPD) W1-9 DM / Neutrino 2 | DM / Neutrino 2 (PPD)

Track Classification: Technical Sessions / Sessions techniques: Particle Physics / Physique des particules (PPD)