



Contribution ID: 124

Type: **not specified**

TALK: Cosmic Stability of Dark Matter from Pauli Blocking

Wednesday, June 26, 2024 2:30 PM (45 minutes)

Why does dark matter (DM) live longer than the age of the Universe? Here we study a novel sub-eV scalar DM candidate whose stability is due to the Pauli exclusion of its fermionic decay products. We analyze the stability of the DM condensate against decays, scatterings (i.e., evaporation), and parametric resonance, delineating the viable parameter regions in which DM is cosmologically stable. In a minimal scenario in which the scalar DM decays to a pair of new exotic fermions, we find that scattering can populate an interacting thermal dark sector component to energies far above the DM mass. This self-interacting dark radiation may potentially alleviate the Hubble tensions. Furthermore, our scenario can be probed through precise measurements of the halo mass function or the masses of dwarf spheroidal galaxies since scattering prevents the DM from becoming too dense. On the other hand, if the lightest neutrino stabilizes the DM, the cosmic neutrino background can be significantly altered from the standard cosmology and thus be probed in the future by cosmic neutrino background detection experiments.

Presenter: BATELL, Brian (University of Pittsburgh)