

Phenomenology 2022 Symposium: From Virtual to Real



Contribution ID: 36

Type: **not specified**

Cosmologically Degenerate Fermions

Monday 9 May 2022 16:30 (15 minutes)

Even in the total absence of thermal kinetic energy, fermionic dark matter must have nonzero momentum due to the Pauli degeneracy pressure. As the fermions were inevitably denser at higher redshifts, a typical fermion may gain a fermi momentum that can exceed its mass. I will talk about the impacts of the transition between nonrelativistic and relativistic behaviour, as revealed by measurements of D_{Neff} and the matter power spectrum. Minimal fermion mass bound will be presented, for a given fraction of the dark matter energy density the fermionic dark matter is occupying. I will also remark on implications for direct detection and suggest models of dark sectors that may give rise to cosmologically degenerate fermions.

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Session Classification: Cosmology II