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Inelastic Dirac Dark Matter

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Feebly interacting thermal relics are promising dark matter candidates.

We introduce inelastic Dirac Dark Matter, a new model with two Dirac fermions in the MeV-GeV mass range. At feeble couplings, dark matter can depart from chemical as well as kinetic equilibrium with the Standard Model during the early stages of its evolution so that its relic abundance is not necessarily set by the well known freeze-out mechanism. The feeble couplings can also give rise to long lived particles in the dark sector. Searches for such particles at colliders and fixed-target experiments are very sensitive probes. Inelastic Dirac Dark Matter offers a new search target for existing and upcoming experiments like Belle II, ICARUS, LDMX and SeaQuest.

Author: JUNIUS, Sam

Co-authors: FILIMONOVA, Anastasiia (Nikhef); LOPEZ HONOREZ, Laura; WESTHOFF, Susanne (Radboud University)

Presenter: JUNIUS, Sam

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