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Not-so-inelastic Dark Matter

Models of inelastic (or pseudo-Dirac) Dark Matter (DM) commonly assume an accidental symmetry between the left-handed and right-handed mass terms in order to suppress diagonal couplings. We point out that this symmetry is unnecessary, because for Majorana fermions the diagonal couplings are not strongly constrained. Removing the requirement of such an accidental ad-hoc symmetry instead relaxes the relic density constraint due to additional annihilation modes and provides a smooth transition between pseudo-Dirac and Majorana dark matter.

In the talk, I will introduce a simple UV-complete model realizing the new asymmetric set-up. Then, I will explain how traditional constraints from (in)direct detection, beam dump experiments and colliders are modified indicating two viable mass regions for the DM particle, around a few hundred MeV and around a few GeV. The former region can be fully tested by near-future analyses of current running high energy experiments, while the latter turns out to be challenging to explore even with future experiments.

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