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Singlet-Doublet Fermionic Dark Matter in Gauge Theory of Baryons

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We propose a two-component fermionic Dark Matter(DM) in a minimal U(1)B extension of Standard Model(SM) with the inclusion of one complex scalar S(1, 1, 0, −3) along with the usual Higgs doublet. Out of the 3 exotic fermions added for anomaly cancellation, DM emerges as a mixture of the neutral component of the fermionic doublet and a singlet fermion. The motivation of our work lies in the fact that in the case of one-component DM candidate, the spin-independent direct-detection(SIDD) cross-section comes out to be larger than the experimental bounds and is thus ruled out. So, in this work, we take two-component singlet-doublet fermionic Dark Matter, where a mixing angle(θ) dependent term between final mass eigenstates of DM particles can significantly relax the SIDD cross-section to within the experimental limits with the right choice of mixing angle. In the model, U(1)B symmetry is broken by the scalar S and a reminent Z2 symmetry ensures the stability of DM candidates. The model thus offers a viable parameter space for a stable DM candidate that can be probed from direct search, collider, and GW experiments.

Session

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