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Singlet-Doublet Fermion Origin of Dark Matter, Neutrino Mass and W-Mass Anomaly

Thursday 15 December 2022 14:00 (1 hour)

Motivated by the recently reported anomaly in W boson mass by the CDF collaboration with 7σ statistical significance, we consider a singlet-doublet (SD) Majorana fermion dark matter (DM) model where the required correction to W boson mass arises from radiative corrections induced by SD fermions. While a single generation of SD fermions, odd under an unbroken Z_2 symmetry, can not explain the W boson mass anomaly while being consistent with DM phenomenology, two generations of SD fermions can do so with the heavier generation playing the dominant role in W-mass correction and lighter generation playing the role in DM phenomenology. Additionally, such multiple generations of SD fermions can also generate light neutrino masses radiatively if a Z_2-odd singlet scalar is included.

Session

Beyond the Standard Model

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