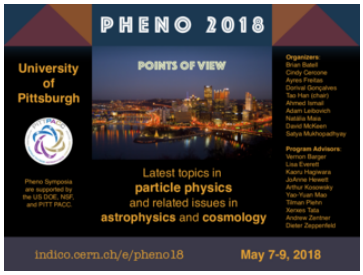

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Exploring the supersymmetric U(1)$_{B-L}\times$ U(1)$_R$ model with dark matter, muon $g-2$ and Z' mass limits

Tuesday 8 May 2018 17:30 (15 minutes)

We study the low scale predictions of supersymmetric standard model extended by $U(1)_{B-L} \times U(1)_R$ symmetry, obtained from $SO(10)$ breaking via a left-right supersymmetric model, imposing universal boundary conditions. Two singlet Higgs fields are responsible for the radiative $U(1)_{B-L} \times U(1)_R$ symmetry breaking, and a singlet fermion S is introduced to generate neutrino masses through inverse seesaw mechanism. The lightest neutralino or sneutrino emerge as dark matter candidates, with different low scale implications. We find that the composition of the neutralino LSP changes considerably depending on the neutralino LSP mass, from roughly half $U(1)_R$ bino, half MSSM bino, to singlet higgsino, or completely dominated by MSSM higgsino. The sneutrino LSP is statistically much less likely, and when it occurs it is a 50-50 mixture of right-handed sneutrino and the scalar $\widetilde{S}$. Most of the solutions consistent with the relic density constraint survive the XENON 1T exclusion curve for both LSP cases. We compare the two scenarios and investigate parameter space points and find consistency with the muon anomalous magnetic moment only at the edge of 2σ deviation from the measured value. However, we find that the sneutrino LSP solutions could be ruled out completely by strict reinforcement of the recent Z' mass bounds. We finally discuss collider prospects for testing the model.

Summary

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