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Higgs sector in Left-Right Mirror Model with Dark Matter

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After observing a Higgs boson, the experiments with higher precision still agree with the Standard Model (SM). However, there are interesting topics related to the Higgs boson that may open the possibility of accepting a theory beyond the SM. For instance, the mechanism by which neutrinos obtain mass is still hidden, processes that involve neutral currents with flavor-changing and CP violation sources, and a candidate for dark matter (DM). These topics can be considered in the model presented in this work. The considered model is based on local gauge symmetry $SU(3)_C \times SU(2)_R \times SU(2)_L \times U(1)_{Y'}$, named in the literature as LR. The LR model can also have a content of particles similar to the left sector but endowed with a right charge, known as mirror particles. From these additional particles one of the mirror neutrinos is proposed as candidate of DM. On the part of the scalar sector, the mirror doublet not only helps to break $SU(2)_R$ symmetry but also provides neutral and heavier Higgs-type scalar that gives an additional channel for the study of DM annihilation. Considering the last data reported by PLANCK Collaboration for non-baryonic content of the matter density, it has been found that heavy Higgs can have masses of the order of ~ 1 TeV.

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