

Minimal left-right symmetric model Higgs phenomenology at the LHC for photon initiated processes

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There has been a great deal of interest in the Left Right symmetric electro-weak gauge theory in recent years due to its potential accessibility at the LHC. The scalar sector of the minimal left right symmetric model (MLRSM) at TeV scale is revisited in light of the photon initiated processes at the large hadron collider (LHC). Without introducing any guest particles and just by adding an extra soft breaking term in MLRSM Higgs potential, we have shown that it is possible to search for the neutral heavier Higgs bosons at the LHC without conflicting with flavor changing neutral Higgs (FCNH) constraints. We have pointed out some tests as well as its potential for discovery of the second Higgs at the LHC. The photon-photon fusion process contributes significantly to the pair production of doubly charged Higgs bosons also at a level comparable to the Drell-Yan production. As a result, the reported experimental lower limit on the mass of $\Delta_L^{\pm\pm}$ ($\Delta_R^{\pm\pm}$) arising from SU(2)_L triplet (singlet) scalar will be improved by including the photon initiated process. The results can be taken as an initial guide in the exploration of the heavy fermiphobic as well as hadrophobic Higgs at colliders via photon initiated process. Results of our analysis will be presented.

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