

Scalars 2017



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Pair production of doubly charged scalar particles in future colliders

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Content :

In this presentation we consider doubly charged scalars pair production and decays within the Higgs Triplet Model (HTM) in lepton and hadron colliders. The HTM is an extension of the Standard Model realising the type II seesaw mechanism [1]. The additional scalar triplet contains the doubly charged particle H^{++} , which contributes to lepton flavour violating (LFV) processes. We discuss relation between the vacuum expectation value (VEV) of the triplet, H^{++} mass, and H^{++} pair production at colliders, taking into account constraints on VEV coming from low energy effects connected with rho-parameter, muon $g-2$, LFV processes and neutrino oscillations (normal and inverted mass scenarios). Branching ratios for H^{++} decays are also discussed. A difference between HTM model and H^{++} pair production predictions when additional right-handed currents are present is discussed. In analysis the newest neutrino oscillation data are taken into account [2]. We apply those data to calculate the $e^+ e^- \rightarrow H^{++} H^{--}$ cross section for both S and T channel and predict cross sections. Then we present the pair production at hadron collider and compare the four lepton signals with results obtained within the Minimal Left Right Symmetric Model [3] where doubly charged scalars are also present.

[1] M.Magg, C. Wetterich, Phys. Lett. B94, 61 (1980)

[2] I. Esteban, M. C. Gonzalez-Garcia, M. Maltoni, I. Martinez-Soler and T. Schwetz, JHEP 01 (2017) 087

[3] G. Bambhaniya, J. Chakraborty, J. Gluza, M. Kordiaczyńska and R. Szafron, JHEP 05 (2014) 033

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