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Comparing $2HDM + S$ and $2HDM + S + N$ models to explain multi-lepton excesses at the LHC

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After the discovery of the Higgs boson at the Large Hadron Collider (LHC), the ATLAS and CMS Collaborations have concentrated to confirm its properties via measurements of different couplings, decay width, and differential distributions of relevant observables. In this context, recent studies on multi-lepton final states in poton-proton collisions unfold some deviations from the Standard Model predictions. A plethora of BSM models are being considered in the literature, including additional scalar/vector bosons, fermions or exotic BSM objects to explain these anomalous features of the LHC data. In fact, the existence of non-zero masses for the neutrinos is clearly an interesting BSM scenario that is expected to be studied both at present and future colliders. With this motivation, in this talk, we will compare two different models, containing two new hypothetical scalar bosons, H and S, which can describe those multi-lepton anomalies reasonably well. In the first model, named $2HDM + S$, we consider the neutral scalar H decays into a lighter one S and the SM Higgs h i.e. $H \to Sh$. Secondly, a model with heavy neutrinos N is introduced $(2HDM + S + N)$ where the dominant decay of the heavy higgs $H \to S(\to NN)S^*(\to NN)$ is considered to analyze various multi-lepton final states to explain the excess.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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