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Searches for heavy scalar resonance through hadronic jet reconstruction using ML techniques at e-p colliders

Extending the Standard Model with second Higgs doublet populate the scalar particle spectrum. Here we take an opportunity to search heavy scalar H resonance of mass around double of Higgs boson, mH = [250 - 270] GeV at future electron-proton (e-p) collider in charged current process. We consider the hadronic decay of $H \rightarrow W+W-\rightarrow jjjj$ and use machine learning tools to reconstruct the mass of H. Further isolation of scattered jets from the e-p collision helps to provide better signal to background significance. Different observable are studied in this work to investigate the nature of H.

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

Yes

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

MSc

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