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The Search of Anomalous Higgs Boson Couplings at the Large Hadron Electron Collider and Future Circular Electron Hadron Collider

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Abstract : The Higgs boson was discovered by the ATLAS and CMS experimental groups in 2012 at the Large Hadron Collider (LHC). Production and decay properties of the Higgs boson, Standard Model (SM) couplings, and limits on effective scale of the Higgs boson’s couplings with other bosons are investigated at particle colliders. Deviations from SM estimates are parametrized by effective Lagrangian terms to investigate Higgs couplings. This is a model-independent method for describing the new physics. In this study, sensitivity to neutral gauge boson anomalous couplings with the Higgs boson is investigated using the parameters of the Large Hadron electron Collider (LHeC) and the Future Circular electron-hadron Collider (FCC-eh) with a model-independent approach. By using MadGraph5_aMC@NLO multi-purpose event generator with the parameters of LHeC and FCC-eh, the bounds on the anomalous Hγγ, HγZ and HZZ couplings in e− p → e− q H process are obtained. Detector simulations are also taken into account in the calculations.

Keywords : anomalos couplings, FCC-eh, Higgs, Z boson
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