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Highly Boosted Higgs Bosons and Unitarity in Vector-Boson Fusion at Future Hadron Colliders

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We study the observability of new interactions which modify Higgs-pair production via vector-boson fusion processes at the LHC and at future proton-proton colliders. In an effective-Lagrangian approach, we explore in particular the effect of the operator $h^2 W_{\mu\nu}^a W^{a,\mu\nu}$, which describes the interaction of the Higgs boson with transverse vector-boson polarization modes. By tagging highly boosted Higgs bosons in the final state, we determine projected bounds for the coefficient of this operator at the LHC and at a future 27 TeV or 100 TeV collider. Taking into account unitarity constraints, we estimate the new-physics discovery potential of Higgs pair production in this channel.

Primary author: ZHAO, Zhijie (Institute of High Energy Physics, Chinese Academy of Sciences)

Co-authors: YAN, Qi-Shu (University of Chinese Academy of Sciences); SUN, Sichun; ZHAO, Xiaoran (Rome Tre University); KILIAN, Wolfgang (University of Siegen)

Presenter: ZHAO, Zhijie (Institute of High Energy Physics, Chinese Academy of Sciences)

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