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Stochastic GW and Multi-Higgs Productions at the Hadron Colliders via Dimension Six Operator

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In an effective field theory approach, we have considered a minimal extension of Standard Model is extended by a non-renormalizable dimension six operator of the form respecting the symmetries of the Standard Model. Such an operator can affect the dynamics of Higgs field and the electroweak phase transition. Presence of such term modifies the triple Higgs coupling. Constraint on the scale parameter Λ is obtained from the di-Higgs data at the LHC Run II. Additionally, such dimension six terms will give rise to additional couplings which will affect tri-Higgs and four-Higgs productions at future high energy, high luminosity hadron colliders. The shape of the scalar potential also gets modified due to such higher dimensional term. It is worthwhile to study the impact of such higher-dimensional operators at suitable gravitational wave (GW) interferometry experiments to probe triple Higgs couplings as a complimentary to traditional collider search methods.

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