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Enhanced $t\bar{t}h$ and Di-Higgs production rates in the Two Higgs Doublet Model

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In the two Higgs doublet extension of the Standard Model, where both Higgs doublets couple to fermions, the production rates for $t\bar{t}h$ and Di-Higgs bosons can be significantly enhanced, consistent with flavor violation constraints and with the known properties of the 125 GeV Higgs boson h. Results of our study leading to this correlated enhancements will be presented. Signal strength for $t\bar{t}h$ can be enhanced by as much as a factor of three, while that for di-Higgs production may be enhanced by a factor of thirty, compared to the Standard Model expectations.

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