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Disentangling Boosted Higgs Boson Production Modes with Machine Learning

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Higgs Bosons produced via gluon-gluon fusion (ggF) with large transverse momentum (p_T) are sensitive probes of physics Beyond the Standard Model. However, high p_T Higgs Boson production is contaminated by a diversity of production modes other than ggF: vector boson fusion, production of a Higgs boson in association with a vector boson and with a top-quark pair. Combining jet substructure and event information with modern machine learning, we demonstrate the ability to focus on particular production modes. These tools hold great discovery potential for boosted Higgs bosons produced via ggF and may also provide additional information about the Higgs Boson sector of the Standard Model in extreme phase space regions for other production modes as well.

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