



Contribution ID: 163

Type: parallel talk

Higgs production in the Georgi-Machacek model through vector boson fusion

Tuesday 5 May 2015 14:30 (15 minutes)

We explore Higgs production via vector boson fusion in the Georgi-Machacek (GM) model. The GM model adds isospin triplet scalars to the SM while preserving custodial $SU(2)$ symmetry. The model contains a custodial quintuplet of Higgs bosons which are phenomenologically distinct from the states of the SM or the 2HDM. The quintuplet is fermiophobic, making vector boson fusion the primary production mode. Using the Mad-Graph5_aMC@NLO framework, we produce differential distributions at NLO with parton shower matching. We find that NLO effects have a significant impact on the shape of the distributions for many observables. We also note that the ratio of the quintuplet state couplings to W versus Z bosons differs substantially from those of the SM, and that this may further impact the shape of the distributions.

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Session Classification: Higgs III