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Status of (e)GM model in the light of NLO unitarity and latest Run II data from LHC

Wednesday 16 October 2024 14:30 (15 minutes)

The most general two-triplet extension of the Standard Model demanding custodial symmetry gives rise to the extended Georgi-Machacek (eGM) model. Via computing one-loop corrections to all $2 \rightarrow 2$ scattering amplitudes in the eGM model, we place NLO unitarity bounds on the quartic couplings. On top of that, we derive stringent conditions on the quartic couplings ensuring there exists no field direction that leads to an unbounded potential. Finally, we perform a global fit for eGM model using HEPfit to these theoretical bounds together with the latest Run II LHC data on Higgs signal strengths. We delineate the allowed ranges for the heavy Higgs boson masses and their mass differences. We re-analyse the conventional GM model by including NLO unitarity bounds for the first time. The global fit for GM model, with these improved theoretical and latest experimental constraints significantly refines the allowed ranges of the quartic couplings and heavy Higgs masses present in the literature.

Track type

SM and Higgs Physics

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