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Multi Higgs and Vector boson production beyond the Standard Model

If the electroweak symmetry breaking is originated from a strongly coupled sector, as for instance in composite Higgs models, the Higgs boson couplings can deviate from their Standard Model values. In such cases, at sufficiently high energies there could occur an onset of multiple Higgs boson and longitudinally polarised electroweak gauge boson (V_L) production. We study the sensitivity to anomalous Higgs couplings in inelastic processes with 3 and 4 particles (either Higgs bosons or V_L's) in the final state. We show that, due to the more severe cancellations in the corresponding amplitudes as compared to the usual 2 to 2 processes, large enhancements with respect to the Standard Model can arise even for small modifications of the Higgs couplings. In particular, we find that triple Higgs production provides the best multiparticle channel to look for these deviations. We briefly explore the consequences of multiparticle production at the LHC.

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