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Profiling Z' bosons using asymmetry observables in top pair production with the lepton-plus-jets final state at the LHC

We study the sensitivity of top pair production and six-fermion decay at the LHC to the presence and nature of an underlying Z' boson, accounting for full tree-level Standard Model interference, with all intermediate particles allowed off-shell. We concentrate on those observables suitable for the lepton-plus-jets final state and simulate experimental considerations, including kinematic requirements and top quark pair reconstruction in the presence of missing transverse energy and combinatorial ambiguity in jet-top assignment. We focus on the differential mass spectra, as well as the charge asymmetry and top polarisation asymmetry, demonstrating the use of these observables in probing the coupling structure of a new neutral resonance, as well as cases in which the asymmetry may form a complementary discovery observable.

Summary

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