

Top-quark pair production sensitivity to heavy new physics at the FCC-ee

martes, 20 de octubre de 2026 13:30 (20)

We study the sensitivity of top-quark pair production at the FCC-ee to heavy new physics, parametrised in the Standard Model effective field theory, using discriminants based on matrix elements. The analysis includes detector reconstruction effects, obtained with a fast simulation of the IDEA detector concept, and jet flavour tagging. We consider dimension-six operators that modify the electroweak couplings of the top quark or generate four-fermion interactions, at leading order and in diagrams with two resonant top quarks. The full six-body kinematic information is employed to maximise the discrimination power against the Standard Model. Two bins per dimension in the space of 12 discriminants, one per operator considered, provide a simple and robust methodology to set nearly optimal multidimensional constraints. Bounds on the new physics scale can reach values up to 30 TeV in a single-operator fit and up to 5 TeV in a global multi-operator fit. A combination with High-Luminosity LHC prospects on top-quark operators shows complementary sensitivities which help lift approximate degeneracies.

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Clasificación de la sesión : Theory and analysis