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Top–antitop quark + X hadroproduction at NLO accuracy with decay and evolution to the hadron level

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Aiming at better understanding of the properties of top quarks, we focus on top–antitop+X production at the LHC, with X being a vector, or scalar/pseudoscalar boson. We show predictions obtained by PowHel, a computing framework based upon the POWHEG-BOX program with input obtained from HELAC-NLO. The POWHEG-BOX generates event files according to the Les-Houches accord, and uses the POWHEG matching formalism to further evolve these events to the hadron level ready for use in any experimental analysis. We discuss the sensitivities of our predictions to the choice of the Shower Monte Carlo code (PYTHIA vs. HERWIG). We show examples of how the choice of different experimental cuts and/or heavy particle reconstruction strategies can affect the predictions and help disentangle our signals from important backgrounds, also involving top-quark production and decay.

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