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## Electroweak top-quark pair production at the LHC with $Z'$ bosons to NLO QCD in POWHEG

We present the calculation of the NLO QCD corrections to the electroweak production of top-antitop pairs at the CERN LHC in the presence of a new neutral gauge boson. The corrections are implemented in the parton shower Monte Carlo program POWHEG. Standard Model (SM) and new physics interference effects are properly taken into account. QED singularities, first appearing at this order, are consistently subtracted. Numerical results are presented for SM and  $Z'$  total cross sections and distributions in invariant mass, transverse momentum, azimuthal angle and rapidity of the top-quark pair. The remaining theoretical uncertainty from scale and PDF variations is estimated, and the potential of the charge asymmetry to distinguish between new physics models is investigated for the Sequential SM and a leptophobic topcolor model.

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