

# An NLO+PS generator for top-pair and $Wt$ production and decay including non-resonant and interference effects

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see Summary

## Summary

I present a Monte Carlo generator that implements significant theoretical improvements in the simulation of top-quark pair production and decay at the LHC. Spin correlations and off-shell effects in top-decay chains are described in terms of exact matrix elements for  $pp \rightarrow \ell^+ \nu_\ell l^- \bar{\nu}_l b \bar{b}$  at NLO QCD, where  $\ell$  and  $l$  are two different leptonic families, and the  $b$  quark is massive. Thus, the contributions from  $t\bar{t}$  and  $Wt$  single-top production as well as their quantum interference are fully included.

Matrix elements are matched to the Pythia8 parton shower using a recently proposed method that allows for a consistent treatment of resonances in the POWHEG framework.

These theoretical improvements are especially important for the interpretation of precision measurements of the top-quark mass, for single-top analyses in the  $Wt$  channel, and for  $t\bar{t}$  and  $Wt$  backgrounds in the presence of jet vetoes or cuts that enhance off-shell effects. The new generator is based on a process-independent interface of the OpenLoops amplitude generator with the POWHEG-BOX framework.

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