

# NLO QCD predictions for off-shell $t\bar{t}W$ production in association with a light jet at the LHC

Thursday 18 July 2024 17:36 (18 minutes)

We will present the state-of-the-art full off-shell NLO QCD results for the  $pp \rightarrow t\bar{t}W^+ j + X$  process. The multi-lepton top-quark decay channel at the LHC with  $\sqrt{s} = 13$  TeV will be analysed. In our calculation off-shell top quarks and gauge bosons are described by Breit-Wigner propagators. Furthermore, double-, single- as well as non-resonant top-quark contributions along with all interference effects are consistently incorporated already at the matrix element level. We will present the results at the integrated and differential cross-section level for various renormalisation and factorisation scale settings as well as different PDF sets. Lastly, we will investigate the effects of the additional jet activity in the  $pp \rightarrow t\bar{t}W^+ + X$  process by comparing the normalised differential cross-section distributions for  $pp \rightarrow e^+\nu_e\mu^-\bar{\nu}_\mu\tau^+\nu_\tau b\bar{b}j + X$  and  $pp \rightarrow e^+\nu_e\mu^-\bar{\nu}_\mu\tau^+\nu_\tau b\bar{b} + X$ .

## Alternate track

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