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Precise predictions for top quark fully-differential decay

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Top quark is a unique probe at the LHC of both testing the standard model of particle physics and searching for new physics beyond. With the high collision energy and luminosity of the LHC, the production and decay of top quark can be measured with the highest precision ever attained. And the theoretical predictions from perturbative calculations are required to match the experimental uncertainties. In this work, based on the soft-collinear effective theory, we introduce a phase slicing method that could be used for the calculation of heavy-to-light fully differential decay at NNLO in QCD. Using the above method we obtain the NNLO QCD corrections to the top quark fully differential decay. Together with the updated EW corrections, finite mass and width effects, they constitute the current most precise predictions for top quark decay.

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