Particle Physics Challenges



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s-channel Single Top Quark Production and Decay at NNLO in QCD

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We report on a fully differential next-to-next-to-leading order (NNLO) calculation of s-channel single top (anti-)quark production with a semi-leptonic decay at the LHC, neglecting the color correlation between the light and heavy quark lines and in the narrow width approximation. The NNLO corrections can increase the cross section by about 10% in the low transverse momentum region of the top quark and reduce scale variation uncertainty. In order to compare with experimental results without unfolding procedures, we also present theoretical predictions with fiducial cuts, including total cross sections and distributions of observables used in the experimental multivariate analysis. The NNLO corrections are found to be about -8% for fiducial cross sections.

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