

# Forward Neutrinos from Charm at Large Hadron Collider

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The currently operating FASER experiment and the planned Forward Physics Facility (FPF) will detect a large number of neutrinos produced in proton-proton collisions at the LHC. In addition to neutrinos from pion and kaon decays, a significant contribution is expected from the decay of charmed hadrons, particularly for electron and tau neutrino flavors. In this talk, we shall discuss two QCD formulations for the production of charm quarks in  $pp$  collisions: the next-to-leading order collinear factorization and the  $k_T$ -factorization approach. We use state of the art fragmentation schemes to obtain hadron cross-sections and validate them against current LHCb data. These calculations are then used to predict the forward neutrino flux from charm hadron decays. We further scrutinize the impact of varying QCD parameters, such as scales, the selection of parton distribution functions, and the modeling of fragmentation, on these predictions. Among these factors, the modeling of fragmentation has a particularly significant impact on the neutrino flux at FASER.

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