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# First determination of $D^*$-meson fragmentation functions and their uncertainties at next-to-next-to-leading order

*Wednesday 1 August 2018 16:40 (20 minutes)*

In this talk, I will present the first set of next-to-next-to-leading order (NNLO) fragmentation functions (FFs) describing the production of charmed-meson $D^*$ from partons [Phys.Rev. D97 (2018) no.7, 074014]. Exploiting the universality and scaling violations of FFs, we extract the NLO and NNLO FFs through a global fit to all relevant data sets from single-inclusive $e^+e^-$ annihilation. The uncertainties for the resulting FFs as well as the corresponding observables are estimated using the Hessian approach.

We evaluate the quality of the {\tt SKM18} FFs determined in this analysis by comparing with the recent results in literature and show how they describe the available data for single-inclusive $D^{*\pm}$-meson production in electron-positron annihilation.

As a practical application, we apply the extracted FFs to make our theoretical predictions for the scaled-energy distributions of $D^{*\pm}$-mesons
inclusively produced in top quark decays. We explore the implications of {\tt SKM18} for LHC phenomenology and show that our findings of this study can be introduced as a channel to indirect search for top-quark properties.

**Authors:**    Dr KHANPOUR, Hamzeh (University of Science and Technology of Mazandaran & Institute for Research in Fundamental Sciences (IPM), IRAN);  Dr SOLEYMANINIA, Maryam (School of Particles and Accelerators, Institute for Research in);  Dr MOOSAVI NEJAD, Seyed Mohammad (Yazd univ. IRAN)

**Presenter:**    Dr KHANPOUR, Hamzeh (University of Science and Technology of Mazandaran & Institute for Research in Fundamental Sciences (IPM), IRAN)

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