



Contribution ID: 28

Type: not specified

## Charm production in association with one and two jets at the LHC

*Wednesday 21 November 2018 12:05 (25 minutes)*

We have studied production of open charm mesons in association with one or two jets at the LHC. The theoretical cross sections are calculated in the leading-order collinear approximation as well as in the  $k_T$ -factorization approach, where a part of higher order corrections is effectively included. Both processes under consideration here give possibilities of detailed testing of pQCD dynamics beyond standard case of inclusive charm cross section. This opens new ways, e.g. for phenomenological verification of different models of transverse-momentum-dependent (unintegrated) parton distribution functions in the case of multi-particle final states. For the case of charm + jet mechanism, different unintegrated gluon distribution functions are used in the  $k_T$ -factorization approach. Several predictions for the LHC are presented, including various correlation observables. Integrated cross sections for  $D_0$ +jet production for ATLAS detector acceptance and for different cuts on jet transverse momenta are also presented [1]. Associated production of charm with two jets is also very interesting from the point of view of searching for multiple-parton interaction effects. We have carefully examined production of  $D_0$ +2jets and  $D_0D_0\bar{0}$ +2jets in both single-parton scattering (SPS) and double-parton scattering (DPS) mechanisms. For both final states we indicate regions of phase-space where the DPS contributions clearly dominate over the standard SPS components. Several correlation distributions useful for measurement of the DPS effects for the LHCb experiment are proposed [2]. [1] R. Maciula, and A. Szczurek, "Charm quark and meson production in association with single-jet at the LHC", Phys. Rev. D94, 114037 (2016). [2] R. Maciula, and A. Szczurek, "Double-parton scattering effects in associated production of charm mesons and dijets at the LHC", Phys. Rev. D96 (2017) no.7, 074013

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**Session Classification:** Wednesday