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From light- to heavy-quark fragmentation in jets: current measurements in pp collisions with the ALICE detector and perspectives

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Measurements of jet fragmentation in heavy-ion collisions are important for investigating the medium-induced parton energy loss.

Partons propagating in a dense and strongly interacting medium lose energy giving rise to a softening of the final hadron p_T -differential spectrum. The presence of the strongly interacting medium may also lead to particle dependent modifications of the fragmentation function.

In particular measurements of the fragmentation of heavy charm and beauty quarks are expected to play a key role. Heavy quarks are an ideal probe of the in-medium energy loss, thanks to their short formation time and their small probability of thermal production from the medium. Their energy loss is expected to be smaller than that of light quarks and this affects also their fragmentation.

In order to quantify the medium effects on jet fragmentation, baseline measurements in elementary collisions such as e^+e^- or pp are needed. These measurement are also important on their own as they test and could further constrain theoretical predictions. Although in the last year significant improvements have been made in NLO QCD parametrizations of fragmentation functions, pp collisions have e.g. different sensitivity to gluon-to-hadron fragmentation with respect to e^+e^- or ep collisions. In addition, measurements of particle-dependent fragmentation in elementary collisions are not well explored in general.

In this talk we will present results on jet fragmentation into charged hadrons, pions, kaons, and protons in pp collisions at $\sqrt{s} = 7$ TeV measured with the ALICE detector. The results will be compared to Monte Carlo generators. In addition, simulation studies and perspectives for the charm fragmentation function measurement will be outlined.

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