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Overview on hadronization of quarks in proton-proton and e+e- collisions

Saturday, 24 June 2023 13:00 (30 minutes)

The so-called hadronization is a non-perturbative QCD phenomenon corresponding to the formation of colourless hadrons from coloured quark constituents. The hadron formation in point-like e^+e^- collisions is described via the Lund string fragmentation, according to which the $q\bar{q}$ pair production in the scattering is followed by a shower of light partons produced via multiple color-string breaking, which produce color singlets in the final states. The probability to obtain a hadron of a given species carrying a certain momentum fraction of the original quark is quantified by the fragmentation functions. They are assumed universal and usually constrained from e^+e^- and e^-p collisions, and they succesfully describe the production of mesons in e^+e^- and pp collisions at the colliders. However, recent measurements of pp collision data from the LHC showed a surprising relative enhancement of baryon production compared to mesons, and model predictions based on Lund string fragmentation do not describe the data. In this talk, an overview of the most recent experimental results of hadron production cross section in pp collisions at the LHC compared with $e+e-$ results will be provided. A comparison with novel theoretical models implementing hadronization mechanisms different from the Lund string fragmentation will be also discussed.

Collaboration

Primary author: FAGGIN, Mattia (University of Padua)

Presenter: FAGGIN, Mattia (University of Padua)

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