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Exploring hadronization mechanisms in deep-inelastic scattering

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Hadronization is process that lays in the heart of QCD and refers to the formation of hadrons from quarks and gluons. Occurred shortly after the Big Bang when quark-gluon plasma cooled, it is currently explored using accelerator facilities and high energy collisions. Following the collision, a highly virtual parton radiates gluons or splits into a quark-antiquark pair - a process, known as fragmentation, it is successfully described by QCD evolution equations. Due to color confinement, the colored partons recombine into colorless objects and at this point the process is dominated by non-perturbative QCD effects which can not be addressed theoretically. For this reason, description of hadronization process relies on phenomenology whose model predictions need to be tested against an actual data. Over the past couple decades, a wealth of data have become available from DESY, Jefferson Lab, Fermilab, and RHIC which all bring different kinds of information on parton propagation and hadron formation. The most direct information on hadron formation comes from Deep-Inelastic Scattering (DIS) and will be discussed in the present talk in the context of Jefferson Lab data obtained using a 5 GeV electron beam and CEBAF Large Acceptance Spectrometer (CLAS) in Hall B. It is to be hoped that the studies of cold QCD matter, once matured, can influence the interpretation of what is seen in the hot dense systems (LHC), in addition to their intrinsic interest for QCD.

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