Contribution ID: **299** Type: **Parallel talk**

A renormalization group analysis of medium-modified fragmentation in SIDIS

Wednesday 29 March 2023 11:50 (20 minutes)

We perform a renormalization group (RG) analysis of cold nuclear matter effect on hadron production in semi-inclusive DIS. We focus on the asymptotic limit where the ratio $t = E/(\mu_D^2 L) \to \infty$, with E, L, μ_D being the energy of the jet, the nuclear size, and the inverse interaction range in cold nuclear matter, while the opacity of the medium remains at order unity. We demonstrate that one can resum the leading $\ln t$ enhanced medium effects by a set of coupled differential RG evolution equations, which accounts for strongly formation-time ordered emissions from the endpoint regions of the medium-induced parton splitting functions. Using this new analytic framework, we obtain a good description of the medium-modified pion production in e-A collisions as measured by the HERMES experiment and present predictions for kinematics relevant for the future EIC. Finally, we discuss its connection to the widely used modified DGLAP evolution approach and implications for the development of the Monte-Carlo event generator for e-A collisions.

Submitted on behalf of a Collaboration?

No

Participate in poster competition?

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Session Classification: WG4

Track Classification: WG4: QCD with Heavy Flavours and Hadronic Final States