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Charm-hadron production in pp and AA collisions

Summary

The enhancements of D_s/D^0 and Λ_c/D^0 ratios in heavy-ion collisions as recently measured at RHIC and the LHC have posed formidable challenges for theoretical models. We address these puzzles by developing a theoretically controlled hadronization framework of heavy quarks that conserves 4-momentum and recovers thermal and chemical equilibrium limits [1]. In particular, we implement space-momentum correlations of charm quarks with flowing partons as a genuine consequence of a hydrodynamic background (but elusive in most coalescence models to date), and an improved charm hadro-chemistry [2] that incorporates additional charm hadrons beyond the current listings by the PDG but predicted by the relativistic quark model and lattice QCD. We show that the charm-hadron data at RHIC and the LHC can be fairly well accounted for by our strong-coupling framework of heavy-flavor transport and hadronization, within current theoretical uncertainties.

[1]. Min He and Ralf Rapp, arXiv: 1906.00035 [nucl-th].

[2]. Min He and Ralf Rapp, Phys. Lett. B795, 117 (2019).

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