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Sequential Coalescence with Charm Conservation in High Energy Nuclear Collisions

Heavy quarks are initially produced in nuclear collisions and the number is conserved during the evolution of the system. We establish a sequential coalescence model with charm conservation and apply it to charmed hadron production at RHIC and LHC energies. The charm conservation enhances the earlier formed hadrons and reduces the later formed ones, which leads to a D_s/D^0 enhancement and a Λ_c/D^0 suppression. The mass dependence of the sequential hadron formation provides us a new tool for studying the quark-gluon plasma hadronization in high energy nuclear collisions.

Ref: arXiv: 1805.10858.

I will also show some new interesting results about open heavy flavor production and ratios in heavy ion collisions at FAIR, NICA and HIAF energy.

Summary

we established a sequential coalescence model with charm conservation and applied it to charmed hadron production in high energy nuclear collisions. By solving the two-body Dirac equation for charmed mesons and hydrodynamic equations for the medium, the sequence of charmed hadron formation is determined. Mesons with charm and strange quarks are formed earlier and enhanced in yields in comparison with those with charm and light quarks. The mass dependence of sequential heavy-quark hadron formation via coalescence provides a unique window for analyzing the quark-gluon plasma hadronization in high energy nuclear collisions.

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