

The 123rd HENPIC seminar by Prof. Shanshan Cao 曹杉杉 (Shandong U.), Sep. 24, 2020, Thursday, 10:30 am (UTC+8)

Talk title: Probing heavy flavor hadronization with hadron chemistry in heavy-ion collisions

Speaker: Prof. Shanshan Cao (Shandong University)

Abstract:

A solid hadronization model is essential for understanding hadronic observables in high-energy nuclear collisions, while still remains a challenge due to its non-perturbative nature. We have developed a hadronization model for heavy quarks and studied their suppression, flow and hadron chemistry in heavy-ion collisions. A complete set of both s and p-wave hadronic states are included, which naturally cover all major heavy flavor hadron states observed in the Particle Data Group, and normalize the coalescence probability of zero momentum heavy quarks with proper hadron sizes. With a strict energy-momentum conservation implemented, the boost invariance of the coalescence probability and the thermal limit of the produced hadron spectrum are respected. By combining this newly developed hadronization scheme with a Langevin-hydrodynamics model that incorporates both elastic and inelastic energy loss of heavy quarks inside the realistic QGP medium, we provide a good description of the nuclear modification factor and elliptic flow of D mesons, as well as the corresponding flavor hierarchy between D and B-decayed electrons. A good description of the charmed hadron chemistry—both pT-integrated and differentiated $\Lambda_c/D0$, $D_s/D0$ and $B_s/B+$ ratios—is obtained at both RHIC and LHC. Systematic uncertainties of our model calculations will also be discussed in detail in the end.

Self-introduction:

Shanshan Cao, currently a professor at Shandong University, got his Ph.D from Duke University in 2014, and worked as postdoc at Lawrence Berkeley National Laboratory from 2014 to 2016, and Wayne State University from 2016 to 2020. His research focuses on theoretical high-energy nuclear physics, in particular, probing properties of the quark-gluon plasma with jets and heavy quarks.

Presenter: Prof. CAO, Shanshan