



Contribution ID: 727

Type: **Parallel Talk**

The QCD Phase Diagram from Statistical Model Analysis

Wednesday, 16 May 2018 09:00 (20 minutes)

Ideally, the Statistical Hadronization Model (SHM) freeze-out curve should reveal the QCD parton-hadron phase transformation line in the (T, B) plane. We discuss the effects of various final state interaction phenomena, like baryon-antibaryon annihilation, core-corona effects or QCD critical point formation, which shift or deform the SHM freezeout curve. In particular, we present a method to remove the annihilation effects by quantifying them with the microscopic hadron transport model UrQMD[1].

We further discuss the new aspects of hadronization that could be associated with the relatively broad cross-over phase transformation as predicted by lattice-QCD theory at low B . That opens up the possibility that various observables of hadronization, e.g. hadron formation or susceptibilities of higher order (related to grand canonical fluctuations of conserved hadronic charges) may freeze out at different characteristic temperatures. This puts into question the concept of a universal (*pseudo*)critical temperature, as does the very nature of a cross-over phase transformation.

[1] F. Becattini, J. Steinheimer, R. Stock and M. Bleicher, Phys.Lett. B764 (2017) 241-246

Content type

Theory

Collaboration

Centralised submission by Collaboration

Presenter name already specified

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Session Classification: Phase diagram and search for the critical point

Track Classification: Phase diagram and search for the critical point