Contribution ID: **106** Type: **not specified**

QCD phase diagram at NICA - K+/pi+ horn effect and light clusters in THESEUS Topic: Heavy-Ion Collisions and QCD Phase Diagram at NICA

Monday, 21 October 2019 15:20 (25 minutes)

I report on recent progress in the development of the Three-fluid Hydrodynamics-based Event Simulator Extended by UrQMD final State interactions (THESEUS) [1] as a tool for investigating signals for the onset of deconfinement and the formation of a hadron-quark matter mixed phase in heavy-ion collisions at NICA energies. I shall cover three main topics:
1. The study of the MPD detector acceptance influence of the baryon stopping signal for deconfinement in the net proton rapidity distributions for the NICAS beam-energy scan [2].
2. Extension of the particlization routine to include light cluster production (deuterium, tritium) and application to study thermal and coalescence schemes; comparison with results from NA49 at 20 and 30 AGeV as well as preliminary results from HADES at 1.3 AGeV with preliminary conclusions on the role of in-medium effects [3].
3. Development of the thermal model scheme of particlization to study the K+/pi+ and K-/pi- ratios as a function of the beam energy, based on the Beth-Uhlenbeck approach to Mott dissociation of kaons and pions in hot, dense quark matter at the hadronization transition [4].

References:
[1] P. Batyuk et al., PRC 94, 044917 (2016)
[2] V. Voronyuk et al., in preparation
[3] G. Roepke et al., PPN Letters 15, 225 (2018)
[4] D. Blaschke et al., PRD 96, 094008 (2017)

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Session Classification: NICA Days 2019 General Session

Track Classification: NICA Days 2019 General Session