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Ambiguities in the hadro-chemical freeze-out of Au+Au collisions at SIS18 energies and how to resolve them

Tuesday, 31 August 2021 13:00 (30 minutes)

The thermal fit to preliminary HADES data of Au+Au collisions at $\sqrt{s_{NN}} = 2.4$ GeV shows two degenerate solutions at $T \approx 50$ MeV and $T \approx 70$ MeV. The analysis of the same particle yields in a transport simulation of the UrQMD model yields the same features, i.e. two distinct temperatures for the chemical freeze-out. While both solutions yield the same number of hadrons after resonance decays, the feeddown contribution is very different for both cases. This highlights that two systems with different chemical composition can yield the same multiplicities after resonance decays.
The nature of these two minima is further investigated by studying the time-dependent particle yields and extracted thermodynamic properties of the UrQMD model. It is confirmed, that the evolution of the high temperature solution resembles cooling and expansion of a hot and dense fireball. The low temperature solution displays an unphysical evolution: heating and compression of matter with a decrease of entropy. These results imply that the thermal model analysis of systems produced in low energy nuclear collisions is ambiguous but can be interpreted by taking also the time evolution and resonance contributions into account.

[1] A. Motornenko, J. Steinheimer, V. Vovchenko, R. Stock and H. Stoecker,
"Ambiguities in the hadro-chemical freeze-out of Au+Au collisions at SIS18 energies and how to resolve them,"
[arXiv:2104.06036 [hep-ph]]

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

Anton Motornenko

Internet talk

Maybe

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