

Hadron yields and fluctuations at the CERN Super Proton Synchrotron: system size dependence from Pb+Pb to p+p collisions

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The kaon to pion ratio K^+/π^+ and the scaled variance ω^- for fluctuations of negatively charged particles are studied within the statistical hadron resonance gas (HRG) model and the Ultra relativistic Quantum Molecular Dynamics (UrQMD) transport model. The calculations are done for p+p, Be+Be, Ar+Sc, and Pb+Pb collisions at the CERN Super Proton Synchrotron energy range to reveal the system size dependence of hadron production. For the HRG calculations the canonical ensemble is imposed for all conserved charges. In the UrQMD simulations the centrality selection in nucleus-nucleus collisions is done by calculating the forward energy E_{F} deposited in the Projectile Spectator Detector, and the acceptance maps of the NA61/SHINE detectors are used. The role of centrality selection on fluctuation measures is studied in detail. A comparison of the HRG and UrQMD results with the data of the NA61/SHINE Collaboration is done. To understand a difference of the event-by-event fluctuations in p+p and heavy ion collisions the centrality selection procedure in the sample of all inelastic p+p events is proposed and analyzed within the UrQMD simulations.

References:

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