

System-size dependence of particle ratio fluctuations in Pb+Pb collisions at 158 AGeV

According to the QCD calculations on the lattice, the dynamical fluctuations of, for example, strangeness to entropy ratio could be enhanced in the co-existence region of the first order phase transition from hadronic to partonic degrees of freedom and in the vicinity of the critical point.

The energy dependence of the K/pi ratio fluctuations measured by the NA49 experiment in central Pb+Pb collisions shows increase towards lower energies, which is not reproduced by the UrQMD model. One of the possible explanations is the scaling of the dynamical fluctuations with average kaon multiplicity. In order to study this hypothesis one would like to fix the acceptance of the detector and measure the event-by-event fluctuations as a function of centrality at fixed beam energy.

In this poster, the centrality dependence of event-by-event fluctuations of K/pi, p/pi and K/p ratios measured by the NA49 experiment in Pb+Pb collisions at 158A GeV will be presented. For all considered ratios, dynamical fluctuations are found to increase in absolute value by 7 - 10% with decreasing centrality. Comparing the centrality and energy dependence of the particle ratio fluctuations, they are found to scale with the particle number dominating the fluctuation measure. I.e. in particular the event-by-event K/pi fluctuations are found to scale with the number of kaons. For p/pi fluctuations the observed scaling supports the interpretation that the measured dynamical fluctuations are a remnant of nucleon resonance feeddown. Detailed investigations have been performed to systematically study the influence of detector acceptance and particle identification.

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