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Strangeness enhancement has been predicted to be one of the important signatures of the formation of the quark gluon plasma (QGP) and event-by-event fluctuations of strangeness may reveal the nature of such phase transition. Dynamical fluctuations in the K/π ratio in central Pb+Pb collisions at energies near $\sqrt{s_{NN}} = 7$ GeV are larger than those predicted by the transport model UrQMD using the observable σ_{dyn} [1,2]. We report results for K/π fluctuations from Cu+Cu at $\sqrt{s_{NN}} = 62.4$ and 200 GeV and Au+Au collisions at $\sqrt{s_{NN}} = 20, 62.4, 130$ and 200 GeV using the STAR detector at the Relativistic Heavy Ion Collider. We observe that the fluctuations in the K/π ratio for central Cu+Cu collisions at $\sqrt{s_{NN}} = 62.4$ and 200 GeV using the variable σ_{dyn} are consistent with the results [2] observed in central Pb+Pb collisions at SPS energies at $\sqrt{s_{NN}} = 6.3, 7.6, 8.8, 12.3,$ and 17.3 GeV using the variable σ_{dyn} . We observe similar consistency for central Au+Au collisions at $\sqrt{s_{NN}} = 20, 62.4, 130$ and 200 GeV. A statistical hadronization model cannot reproduce the incident energy dependence of these fluctuations [3]. The centrality dependence of K/π fluctuations for Cu+Cu and Au+Au collisions at $\sqrt{s_{NN}} = 62.4$ and 200 GeV as characterized by the variable $\nu_{dyn,K\pi}$ seems to scale with $dN/d\eta$. Relating the observed centrality dependence of these fluctuations observed in Cu+Cu and Au+Au collisions at $\sqrt{s_{NN}} = 62.4$ and 200 GeV using $\nu_{dyn,K\pi}$ to the incident energy dependence of fluctuations in central collisions using σ_{dyn} , we find a smooth scaling, decreasing slightly with increasing incident energy. The scaled values fall in the middle of the fluctuations between $\sqrt{s_{NN}} = 6.3$ and 17.3 GeV [1]. We also compare the difference between $\nu_{dyn,K\pi}$ for same sign particles and opposite sign particles to the predictions of a statistical hadronization model [3].

References

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