The p/π ratio p_T-dependence in the RHIC range of baryo-chemical potential

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BRAHMS measurement of proton-to-pion ratios in Au+Au, Cu+Cu, p+p at $\sqrt{s_{NN}} = 62.4$ GeV and $\sqrt{s_{NN}} = 200$ GeV will be presented as a function of transverse momentum and collision centrality within the rapidity range $0 \leq y \leq 3$. The baryo-chemical potential, μ_B, for the indicated data spans from $\mu_B \approx 25$ MeV ($\sqrt{s_{NN}} = 200$ GeV, $y = 0$) to $\mu_B \approx 260$ MeV ($\sqrt{s_{NN}} = 62.4$ GeV, $y \approx 3$) [1]. The theoretical and experimental studies of the phase diagram in the $T(\mu_B)$ plane suggest that the gap between the temperature of the transition from the hadronic to the partonic phase, T_c, and temperature of chemical freeze-out increases with increasing μ_B. It was found [2] that at midrapidity region parton recombination model [3] provides a good description of p/π^+ ratios whereas the hydrodynamic model [4] fails in describing the shape of p/$\pi(p_T)$. However, for larger values of μ_B the pure recombination picture might be spoiled by the expected growth of the final-state hadron interaction. Eventually, this will lead to the behaviour reckoned for the expanding gas of hadrons. Comparison of the measured p/π ratios at different beam energies and rapidities with theoretical models [3,4,5] will allow to verify the above picture leading to better understanding of basic features of the phase diagram of strongly interacting matter.

References

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