Longitudinal expansion and equation of state as observed in BRAHMS data

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Data collected by the BRAHMS Collaboration on pion rapidity distributions ($\mathrm{d}N/\mathrm{d}y(y)$) in Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV [1] show good agreement with the Landau model [2] of full stopping. On the other hand, net proton distribution and the apparent saturation of average rapidity loss of the incoming nucleons for high beam energies [3] suggest applicability of the transparency scenario devised by Bjorken [4]. Measurements from BRAHMS experiment on Au + Au, Cu + Cu and p + p collisions will be used to obtain rapidity distributions for pions, kaons and antiprotons in several centrality classes. These results will be compared to hydrodynamical models that take into account longitudinal flow, like those presented in [5] or [6]. Comparison of the data at different colliding species, beam energies and collision centralities with theoretical expectations will give us insight into the basic properties of the matter produced in heavy ion collisions: the equation of state or the initial energy density. It might also open the possibility of distinguishing between the Landau or Bjorken scenarios.

References

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