High Energy Physics - Phenomenology

Experimental equation of state in proton-proton and proton-antiproton collisions and phase transition to quark gluon plasma

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We deduce approximate equations of state from experimental measurements in proton-proton and proton-antiproton collisions. Thermodynamic quantities are estimated combining the measure of average transverse momentum <pt> vs pseudorapidity density dN/deta with the estimation of the interaction region size from measures of Bose Einstein correlation, or from a theoretical model which relates dN/deta to the impact parameter. The results are very similar to theory predictions in case of crossover from hadron gas to quark gluon plasma. According to our analysis, the possible crossover should start at dN/deta about 6 and end at dN/deta about 24.

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