

Production of pions, kaons, and (anti-)protons in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV at RHIC

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Abstract

1 Quantum Chromodynamics (QCD) predicts the existence of a deconfined state of matter
2 called Quark-Gluon Plasma (QGP) at sufficiently high-temperature and/or high-energy
3 density. In order to investigate the phase diagram of QCD matter, the first phase of the
4 Beam Energy Scan (BES-I) program started at the Relativistic Heavy Ion Collider (RHIC)
5 in the year 2010. In continuation of BES-I, a high statistics dataset from Au+Au collisions
6 at $\sqrt{s_{NN}} = 54.4$ GeV was recorded by the STAR experiment at RHIC in the year 2017.
7 The transverse momentum (p_T) spectra of identified hadrons are essential to study the bulk
8 properties such as integrated yield (dN/dy), average transverse momenta ($\langle p_T \rangle$), particle
9 ratios, and freeze-out parameters of the medium produced. The systematic study of bulk
10 properties can shed light on the particle production mechanism in heavy-ion collisions.

11 In this talk, we will present the p_T -spectra of hadrons (π^\pm , K^\pm , p, and \bar{p}) at mid-
12 rapidity ($|y| < 0.1$) in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV. The centrality dependence
13 of dN/dy , $\langle p_T \rangle$, particle ratios, chemical freeze-out and kinetic freeze-out parameters will
14 also be presented and compared with the measurements at other beam energies.