Transverse momentum spectra of identified hadrons in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV at RHIC

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Abstract

Quantum Chromodynamics (QCD), the theory of strong interactions, predicts that at sufficiently high-temperature and/or high-energy density normal nuclear matter converts into a deconfined state of quarks and gluons, known as Quark Gluon Plasma (QGP). The Relativistic Heavy Ion Collider (RHIC) has recorded data from Au+Au collisions at $\sqrt{s_{NN}}$ = 7.7 - 200 GeV to study the QCD phase diagram and the properties of QGP. In the year 2017, a high statistics dataset from Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV was recorded by the STAR experiment at RHIC to fill the energy gap between 39 and 62.4 GeV. The transverse momentum (p_T) spectra of identified hadrons are essential to study the bulk properties, such as integrated yield (dN/dy), average transverse momenta ($\langle p_T \rangle$), particle ratios, and freeze-out properties of the medium produced. The systematic study of these bulk properties may provide insight into the particle production mechanism and evolution of the system formed in heavy-ion collisions.
In this presentation, we will present the p_T-spectra of identified hadrons ($\pi^{\pm}$, $K^{\pm}$, p and $\bar{p}$) at mid-rapidity ($|y| < 0.1$) in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV. The dN/dy, $\langle p_T \rangle$ and particle ratios will also be presented and compared with the previously published results at other beam energies.