Probing Hydrodynamics at 7.7 GeV: Model Comparisons of the Bulk Properties of Au+Au Collisions.

Motivation: high baryon density at 7.7 GeV. Applicability of hydrodynamics at low energy range?

Method: comparison of the bulk properties of the medium produced in Au+Au collisions at 7.7 GeV with AMPT (string melting), EPOS4, PYTHIA8 and SMASH approaches.

- Selection criteria: mid-rapidity (|y| < 0.1) $\pi^{\pm}$, $K^{\pm}$, $\bar{p}$ and p and within the vertex radius of $\sqrt{V_x^2+V_y^2}<2\,cm$. Transverse momentum range of *0.2-2.0* GeV for $\pi^{\pm}$, $K^{\pm}$ and *0.4-2.0 GeV* for $\bar{p}$ and p particles.

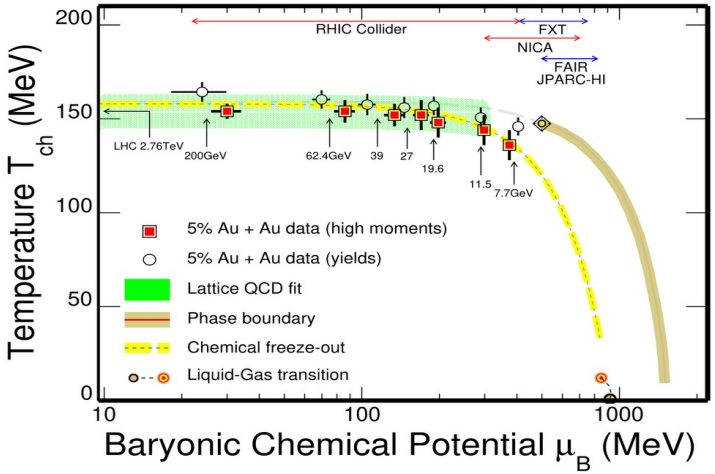
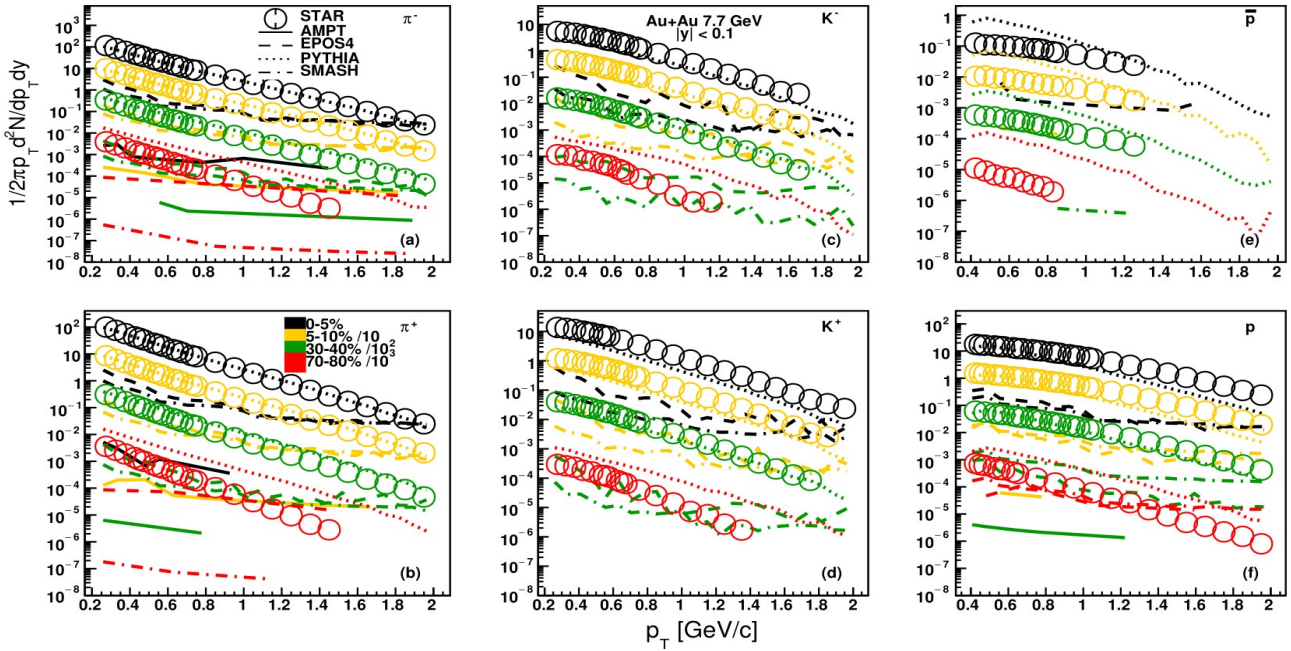


Fig1: A summary of the chemical freeze-out temperature T_{ch} (μ_B) distribution. Data points are from the 0-5% central Au+Au collisions at STAR BES.

→ **Transverse Momentum (pT)**



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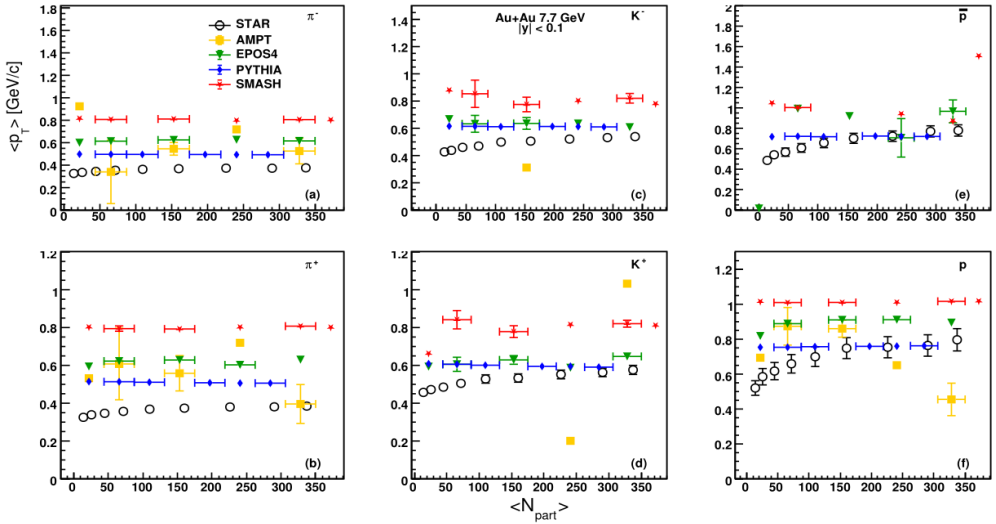
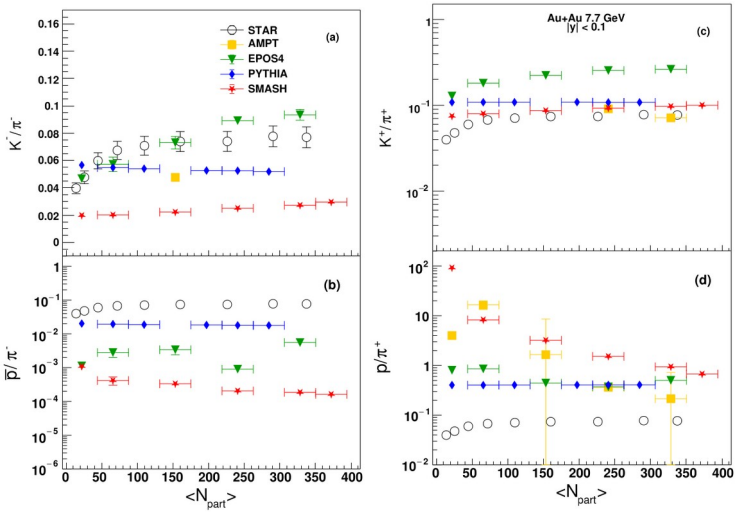
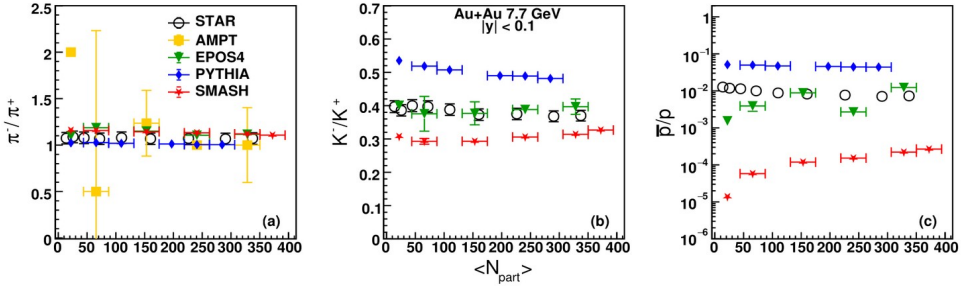
→ Mean transverse momentum <pT>



→ Mixed-particle ratio



→ Antiparticle-to-particle ratio



Conclusions

For the p_T spectra analysis, PYTHIA8 predicts well the distributions of $\pi^{\pm}$ and $K^{\pm}$ particles from mid to central collisions. However, for the $\langle p_T \rangle$, it shows no dependence on the collision centrality. EPOS4 fairly describes the K^-/K^+ and $\bar{p}/p$ ratios from mid-to-central collisions, indicating hydrodynamical effects of this observable even at the low center-of-mass energy range. Other models demonstrated limited description of the experimental data.