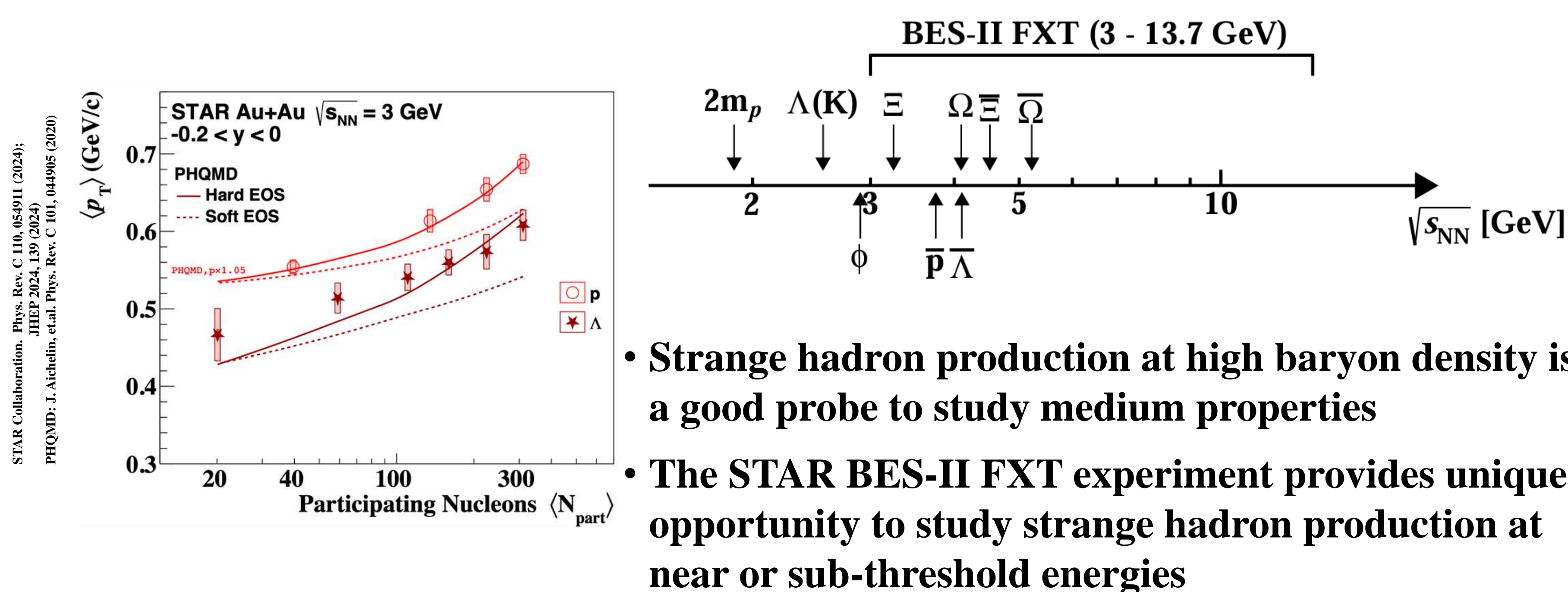
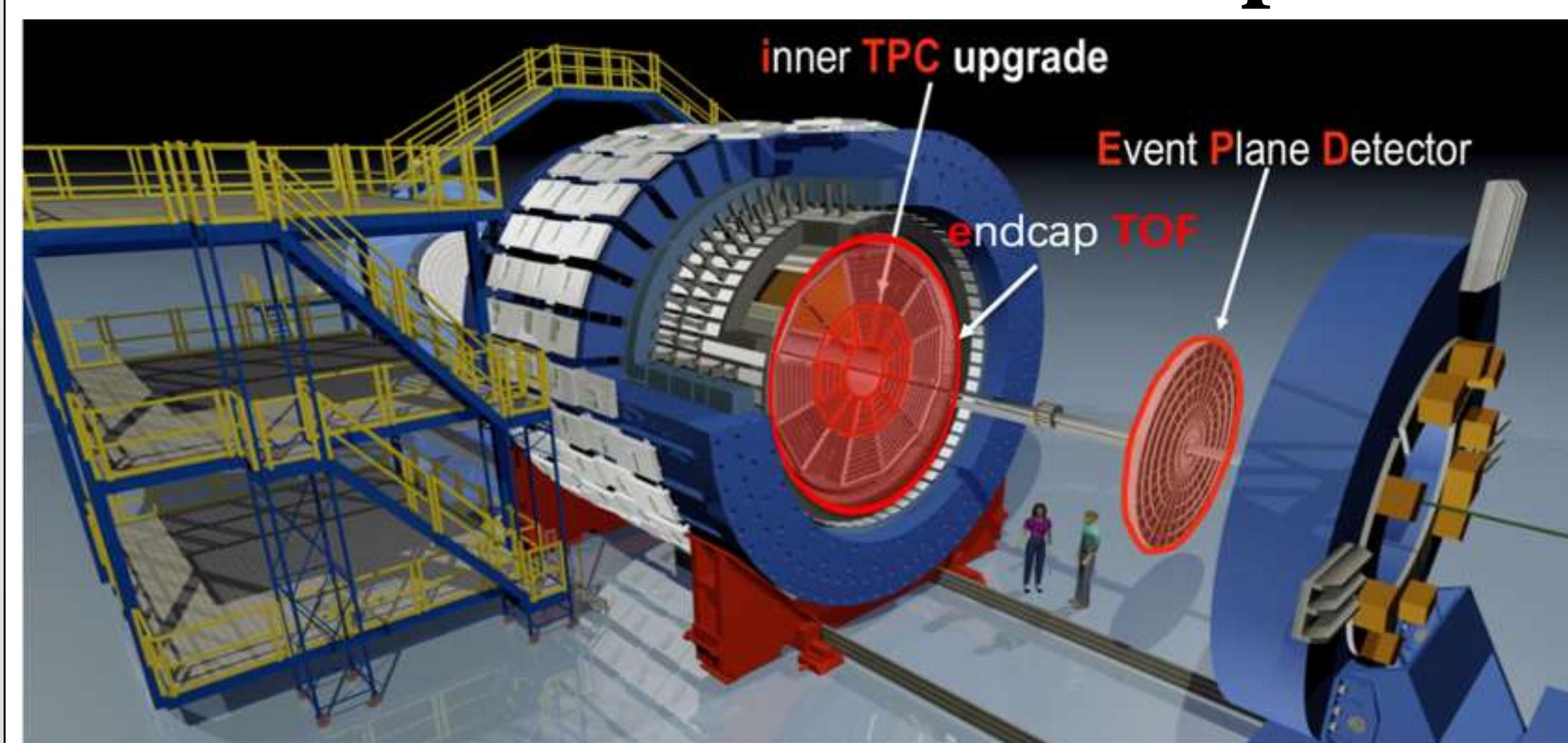


In this poster, we will present measurements of strange hadron production in Au+Au collisions at $\sqrt{s_{NN}} = 3.0, 3.2, 3.5, 3.9, 4.5, 5.2$ and 6.2 GeV with the fixed-target mode from STAR BES-II experiment. The transverse momentum spectra and rapidity densities of K^\pm , K_S^0 , ϕ , Λ , Ξ^- and their yield ratios ϕ/K^- , ϕ/Ξ^- , K_S^0/Λ , Λ/p , Ξ^-/Λ will be presented. We will also explore the centrality dependence of strange hadron yields and the evolution of their kinetic freeze-out temperature T_{Kin} and average radial expansion flow velocity $\langle\beta_T\rangle$ extracted from the Blast-Wave model in the reported energy range, which can give insights on the EoS of the created medium. These results will be compared with those from higher collision energies and the physics implications will be studied by comparing to the thermal and transport model calculations.

Motivation

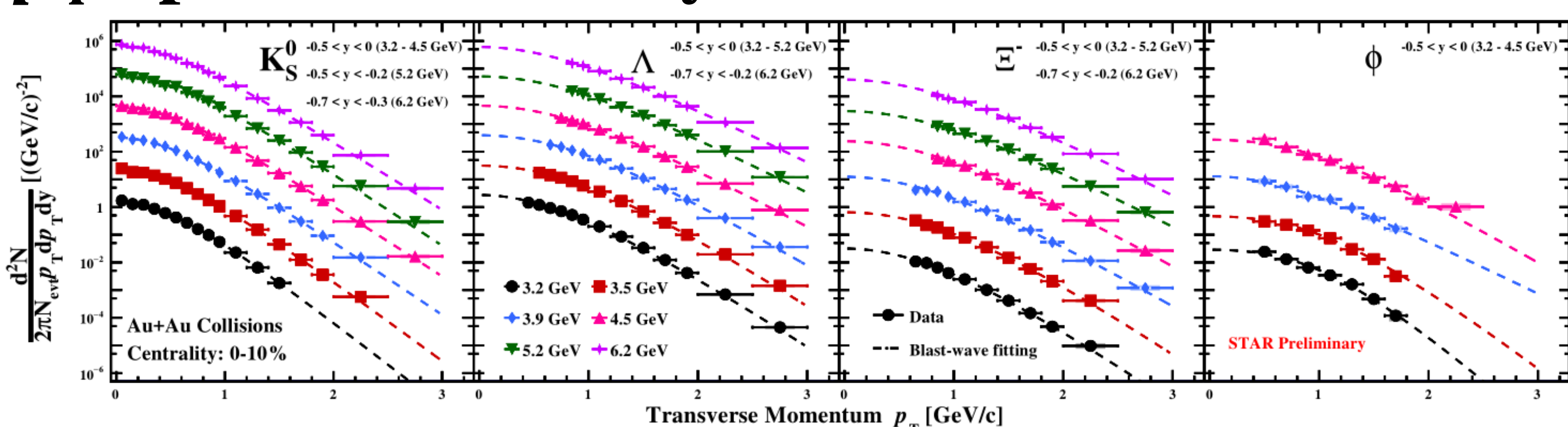


STAR detector in FXT setup

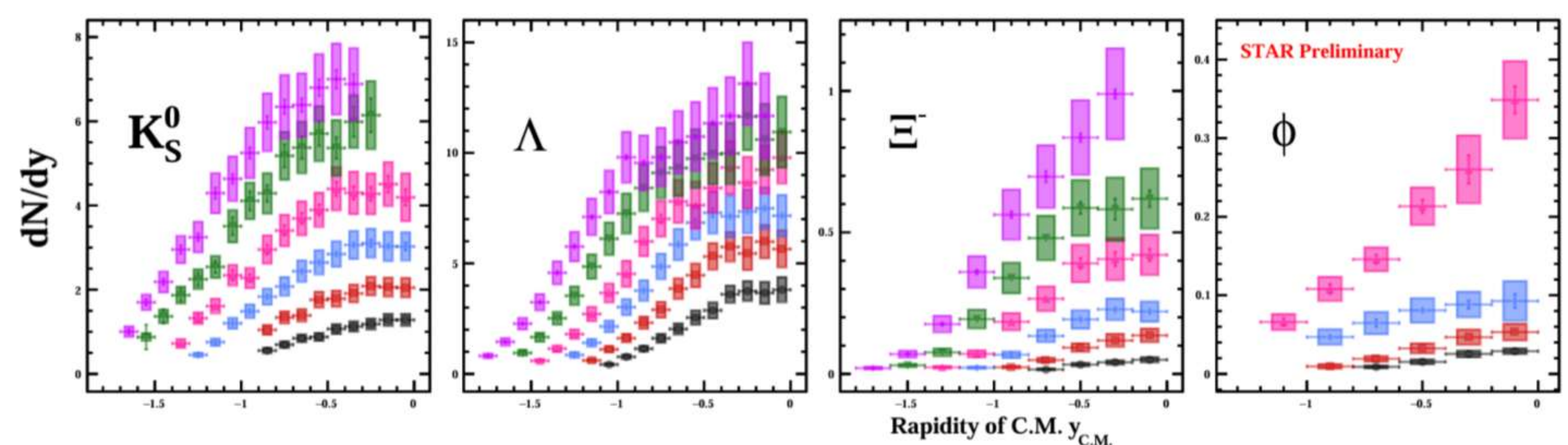


- **Detector upgrades**
 - **Time Projection Chamber (TPC & inner TPC: $-2.4 < \eta < 0$)**
 - **Time-of-Flight**
 - Barrel TOF: $-1.45 < \eta < 0$ & end-cap TOF: $-2.15 < \eta < -1.55$

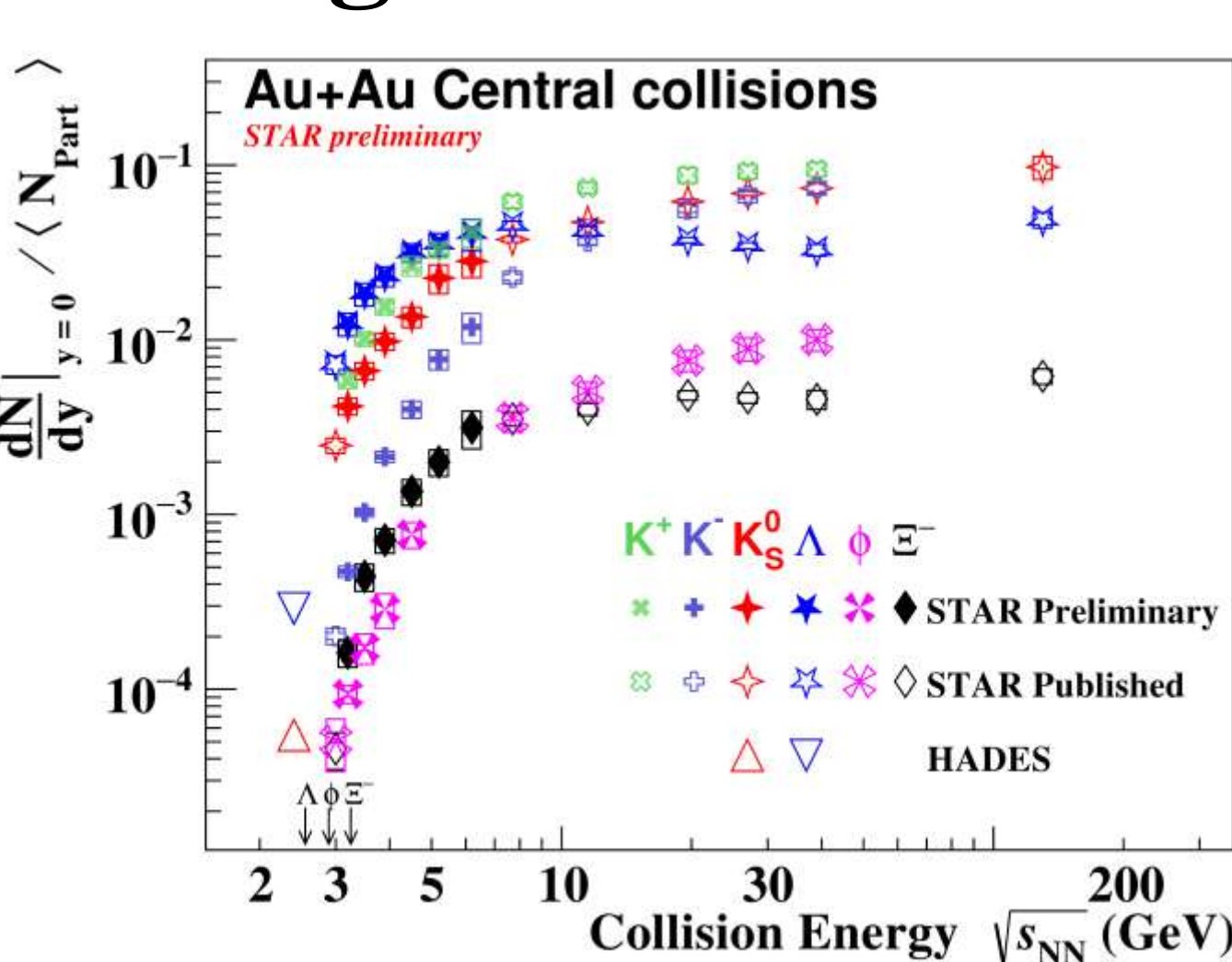
p_T Spectra and dN/dy



- **Comprehensive measurements for strange hadron production at STAR FXT energies**

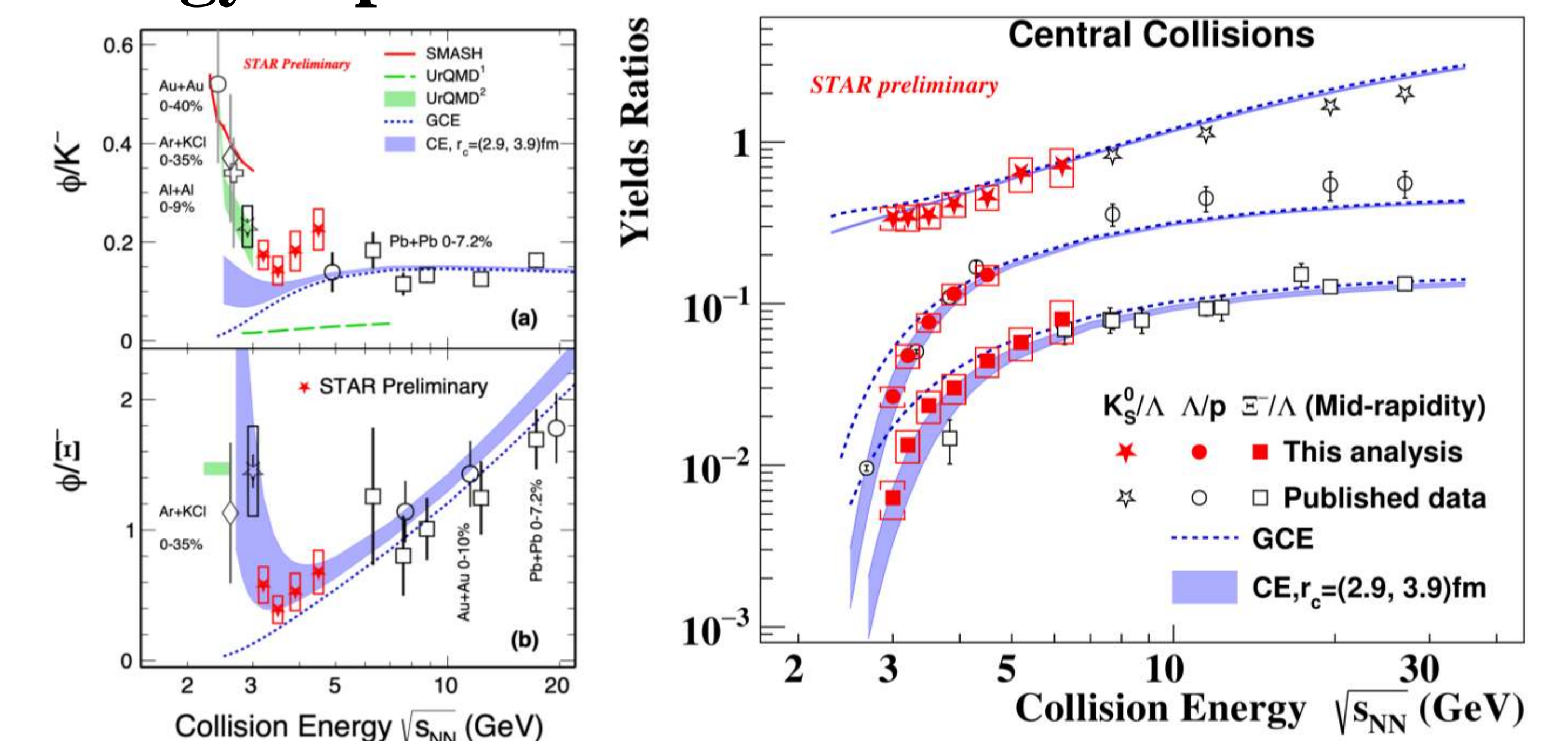


Strangeness Excitation function



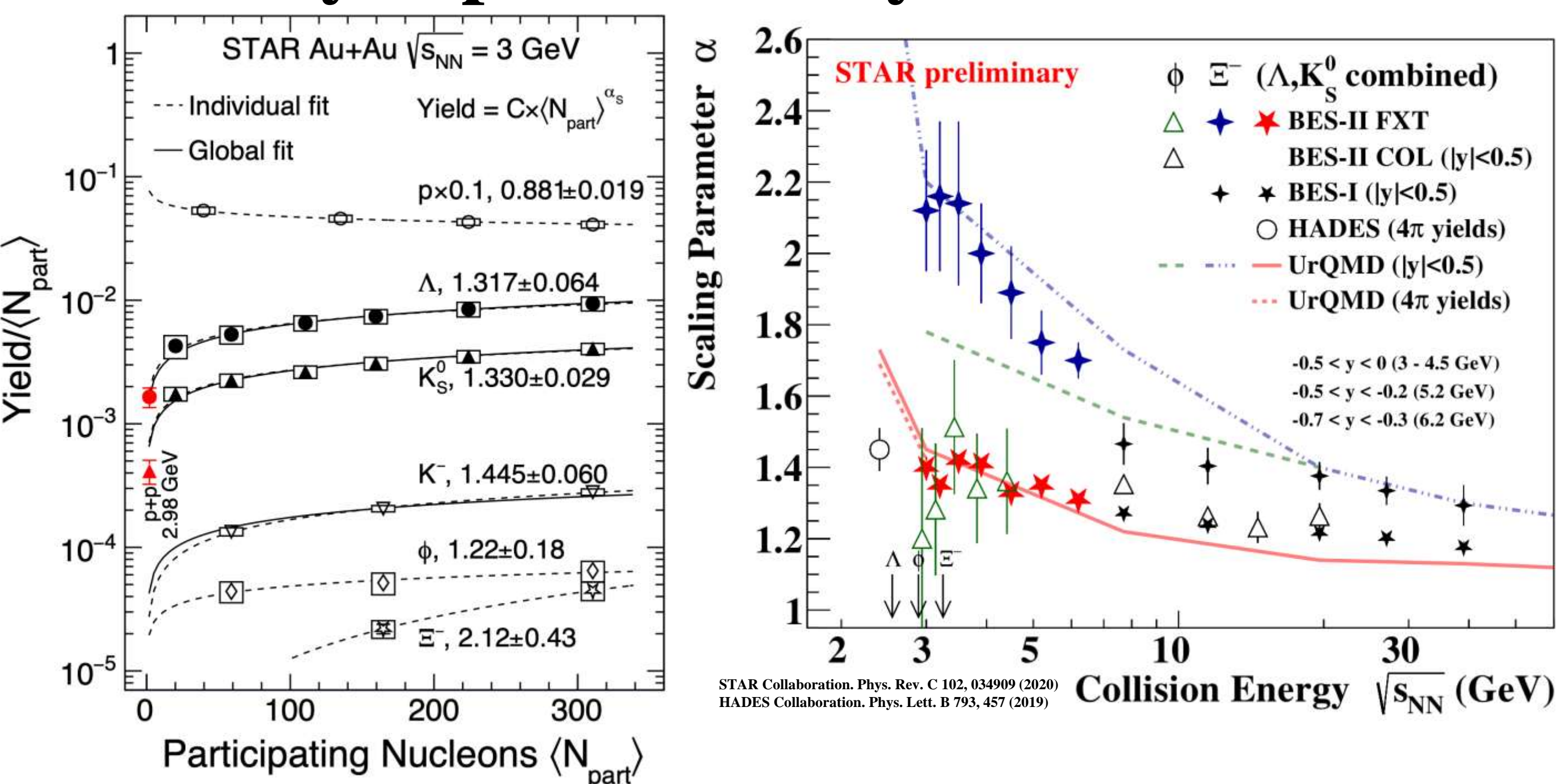
- **Mid-rapidity yields increases rapidly at low energy and approximately saturate at high energy**
- **First measurement of Ξ^- at sub-threshold energies in Au+Au collisions**
- **Λ yields exceed those of K_S^0 below $\sqrt{s_{NN}} \sim 8$ GeV**
 - **Due to higher baryon density at low collision energies**

Energy dependence of Yield Ratios



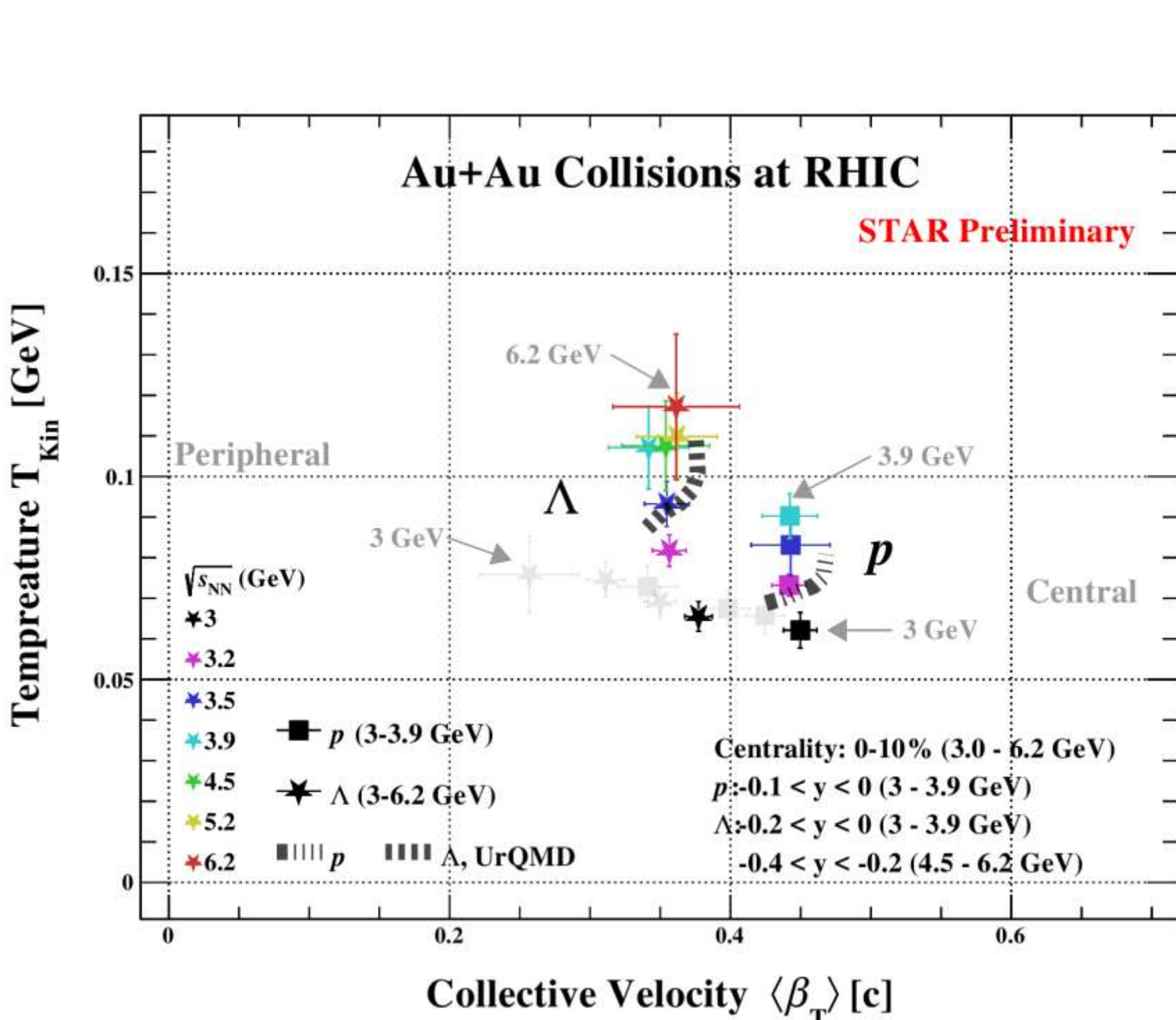
- CE describe yield ratios with $r_c \sim 3 - 4$ fm, but GCE fails below $\sqrt{s_{NN}} \sim 5$ GeV
- Local strangeness conservation is important in high baryon density region
- Medium properties may change in high baryon density region

Centrality dependence of yields



- **Scaling parameter α decreases with increasing energy**
 - $\Lambda(K_S^0)$ and ϕ have similar α , but Ξ^- has significantly larger α below $\sqrt{s_{NN}} \sim 7$ GeV
 - Likely due to Ξ^- mainly produced via multi-step hadronic interactions
e.g.: $NN \rightarrow NN^*$ & $N^*N \rightarrow N\bar{K}K$, $NN \rightarrow N\Lambda K$ & $\Lambda\Lambda \rightarrow N\Xi$
- **Transport model simulations UrQMD**
 - Qualitatively reproduces the energy dependence
 - Overestimates α for ϕ meson

Kinetic Freeze-out



- T_{Kin} increases while $\langle\beta_T\rangle$ remains almost constant from $\sqrt{s_{NN}} = 3 - 6.2$ GeV for Λ
- Different freeze-out parameters between proton and Λ from $\sqrt{s_{NN}} = 3 - 3.9$ GeV
 - May be due to different production mechanisms
- Hadronic transport model UrQMD qualitatively reproduces the trend at STAR FXT energies