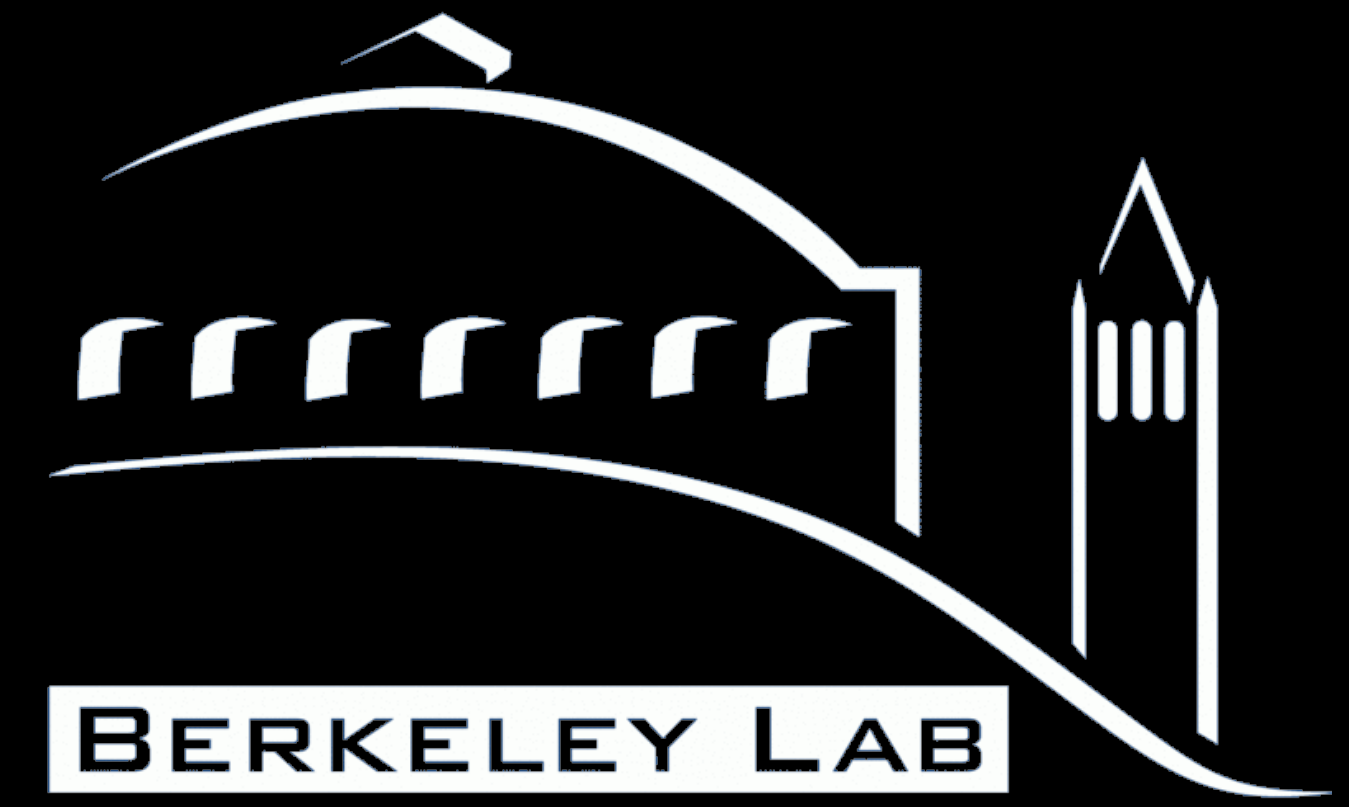


Charged Hadron R_{CP}

in Au+Au Collisions at $\sqrt{s_{NN}} = 7.7 - 62.4$ GeV



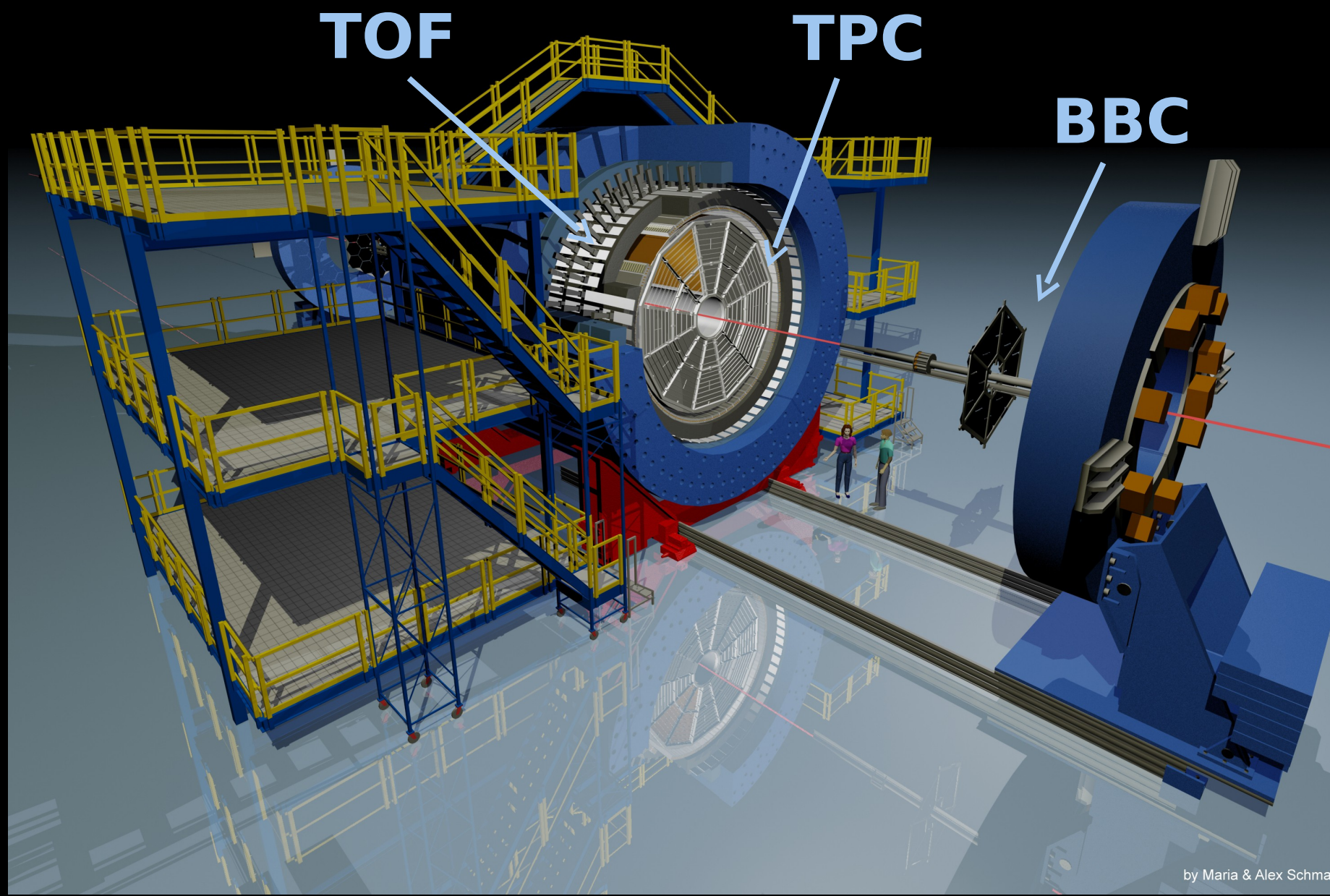
Evan Sangaline* for the STAR Collaboration
RNC Program

*UC Davis and Lawrence Berkeley National Laboratory

Motivation

- The three main goals of the RHIC Beam Energy Scan (BES) were to look for evidence of:
 - I. Critical Point
 - II. Phase Transition
 - III. **Turn Off of QGP Signatures**
- Suppression of R_{CP} at high p_T is a key signature of QGP formation
- The evolution of this signature across collision energies helps to better understand the nuclear phase diagram

The Experiment



Solenoidal Tracker
At RHIC

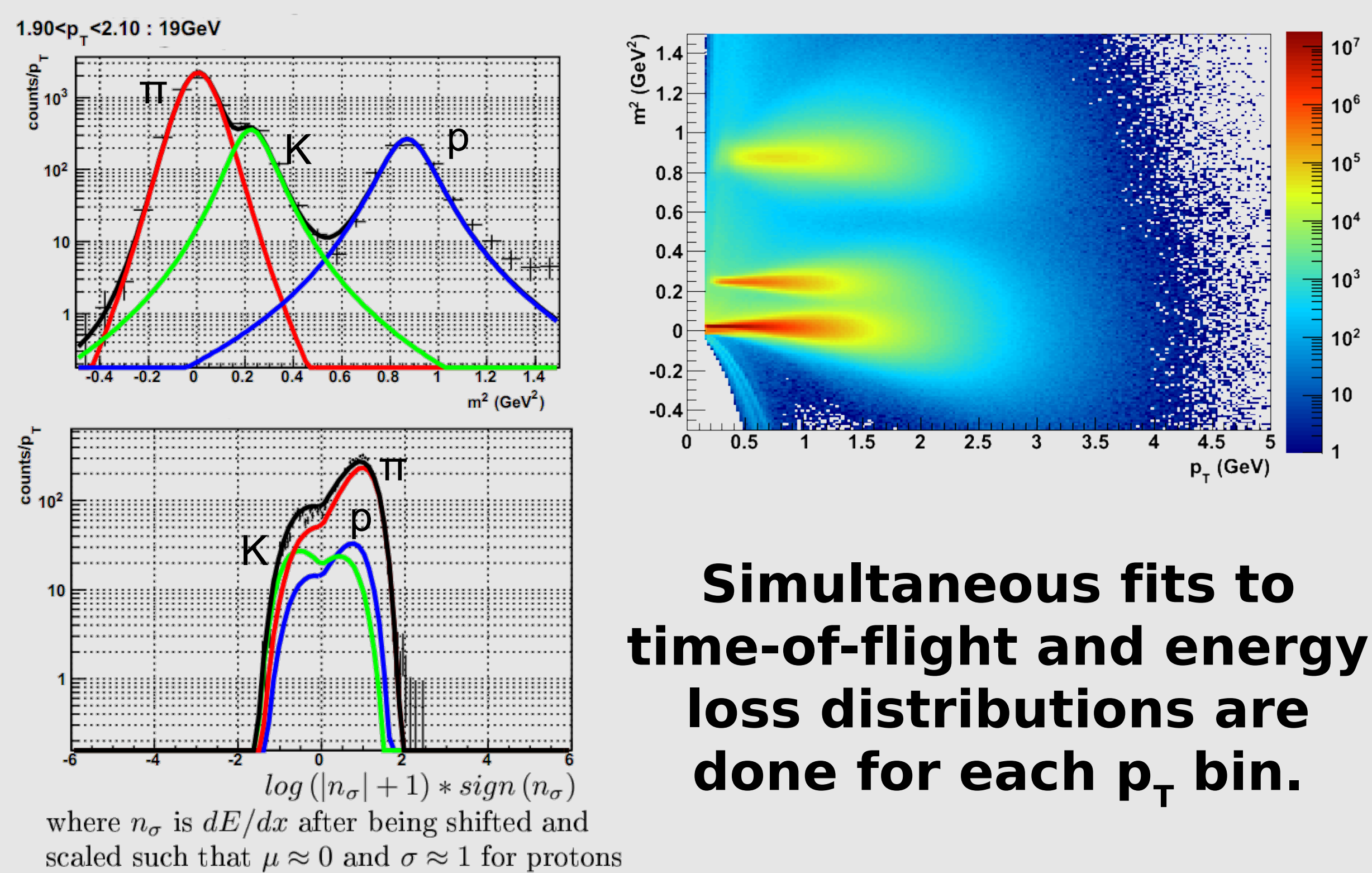
Methodology

- Mean number of collisions determined for each centrality bin using Monte Carlo Glauber fits
- Particle spectra scaled by the number of collisions
- The ratio taken giving the nuclear modification factor, R_{CP} :

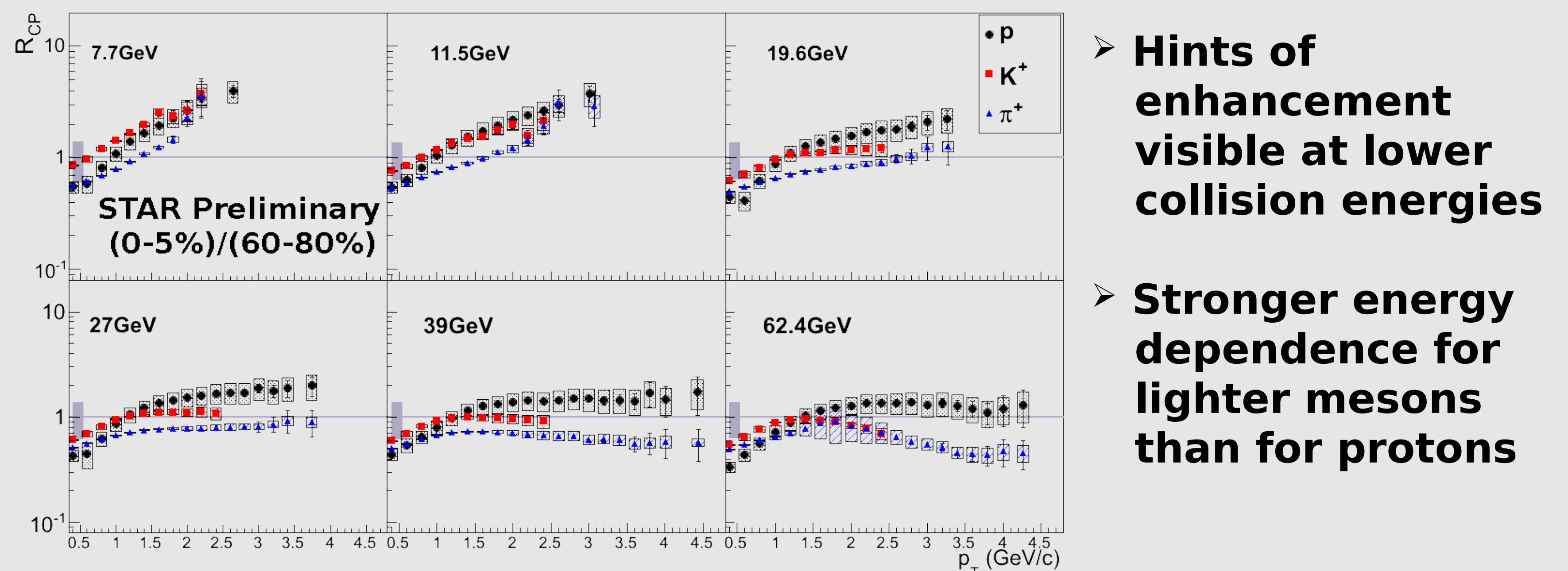
$$R_{CP}(p_T) = \frac{\langle N_{coll}^{AA} \rangle_{60-80\%}}{\langle N_{coll}^{AA} \rangle_{0-5\%}} * \frac{d^2 N_{AA}^{0-5\%} / dy dp_T}{d^2 N_{AA}^{60-80\%} / dy dp_T}$$

Suppression below one is indicative of in medium partonic energy loss in central collisions.

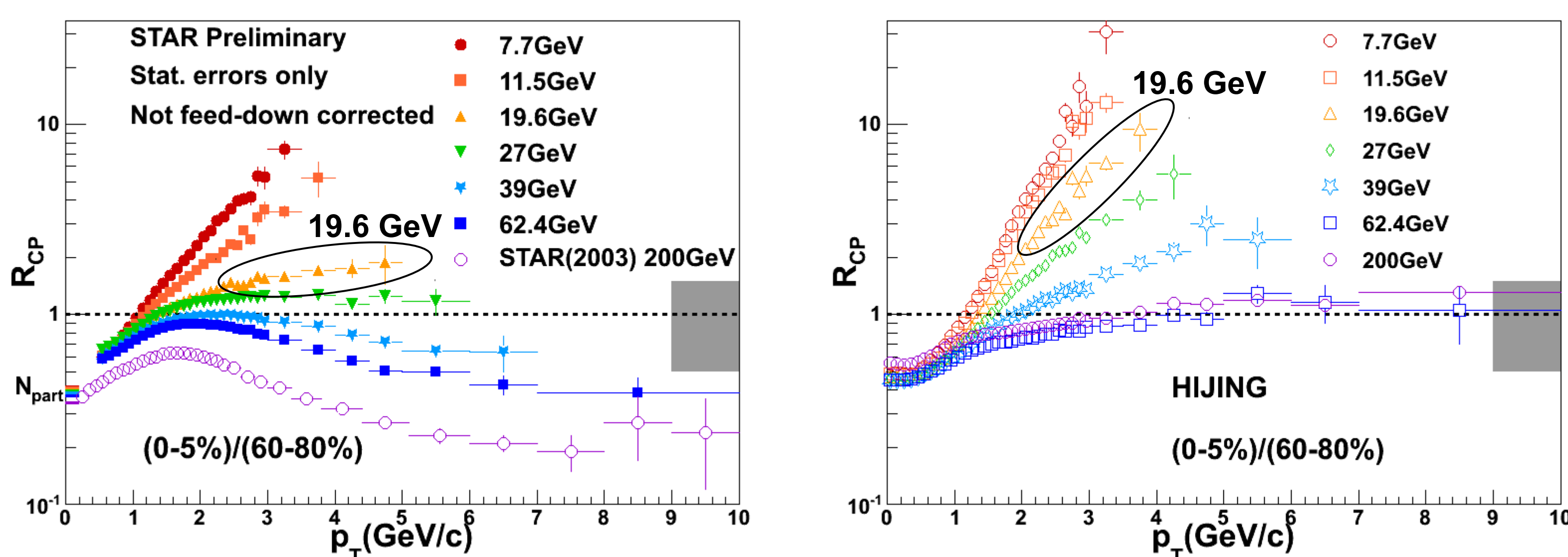
Yield Extraction



Identified Particle R_{CP}



Unidentified Particle R_{CP}



- Clear suppression at the higher collision energies
- Becomes a large enhancement at 7.7 and 11.5 GeV
- HIJING with k_T broadening and no in-medium energy loss qualitatively matches the overall trend
- Cannot fully describe the R_{CP} at 19.6 GeV and above

Summary

- A dramatic change in the suppression pattern of R_{CP} measurements across the RHIC BES energies is observed
- Possible indication of the turn off of partonic energy loss in a QGP medium
- Overall trend is observed in HIJING simulations with no partonic energy loss
- Large contributions due to Cronin effect and radial flow
- HIJING and data show differences in behavior at 19.6 GeV and above
- Suggests that partonic energy loss plays a significant role at these collision energies