Azimuthal Correlations with high-pt multi-hadron cluster triggers in Au+Au Collisions at $\sqrt{s_{NN}}$ = 200 GeV from STAR

Brooke Haag for the STAR Collaboration

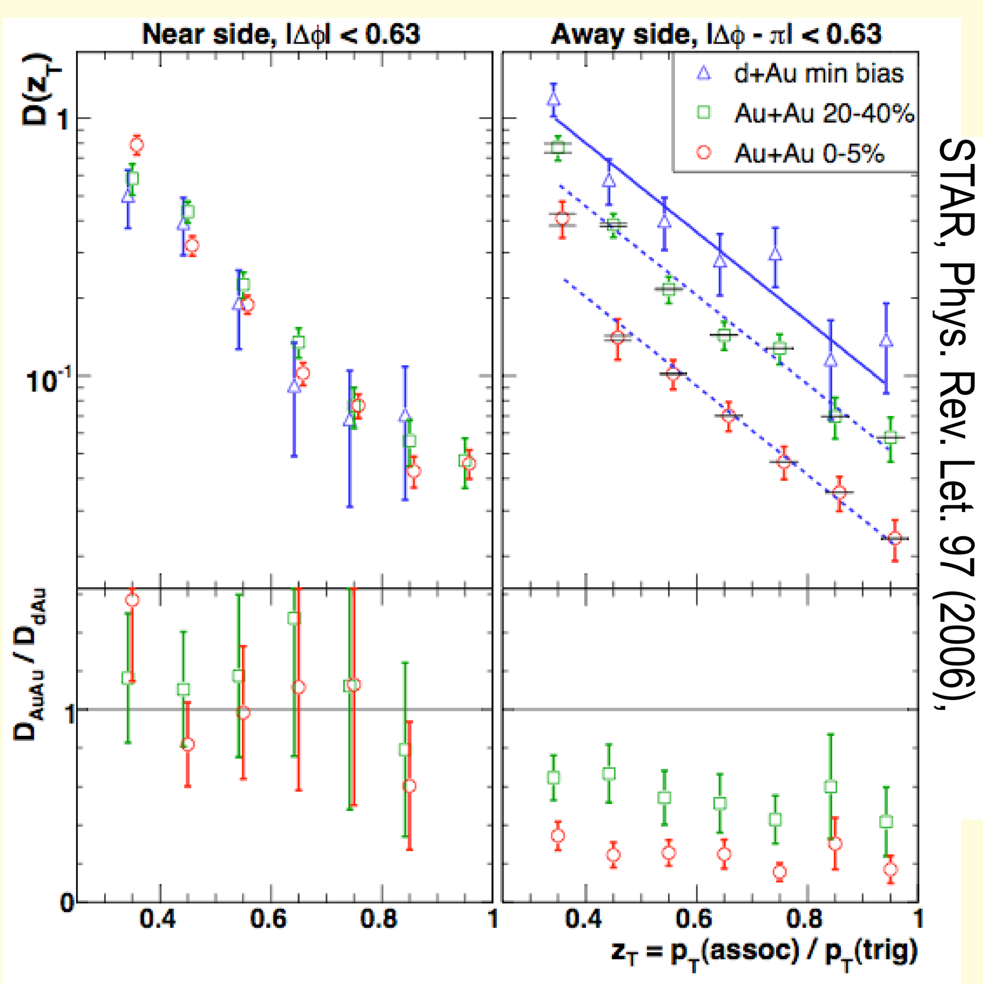
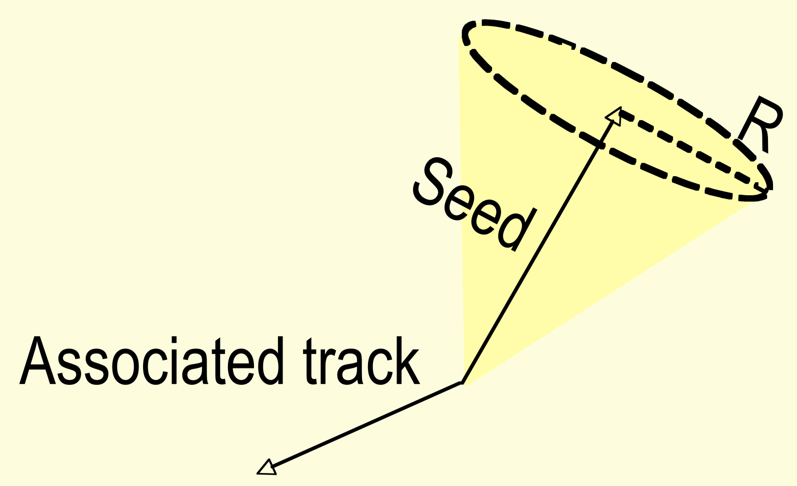
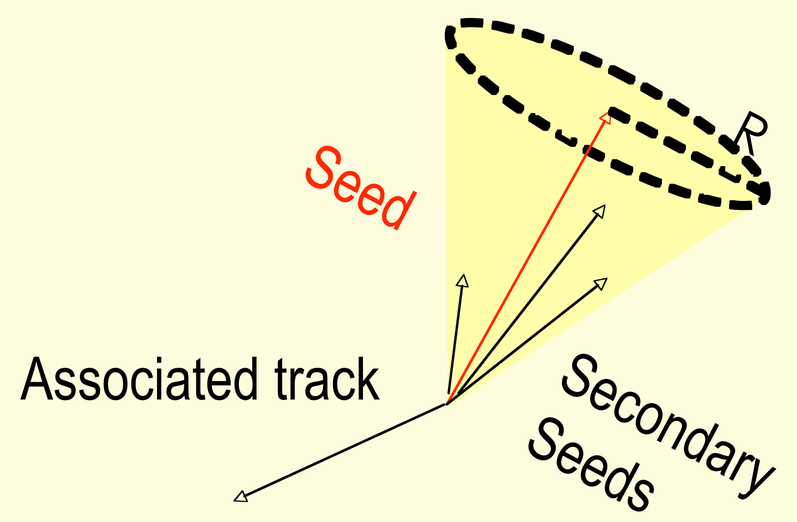


Figure 1: The fragmentation function, D(z), depends on z defined as $p_T/E_{T,jet}$, the fraction of momentum carried away by a fragmented hadron from a jet. The current method of di-hadron correlations is insensitive to true fragmentation functions as it approximates $E_{T,jet}$ from the leading hadron in a jet. We implement the multi-hadron trigger as a better approximation to $E_{T,jet}$ and subsequently to fragmentation functions.



Di-hadron correlation



Multi-hadron correlation

ANALYSIS TECHNIQUE

- Collect arrays of "seed" and associated tracks with a minimum seed p_T cut (5.0 GeV) and a minimum associated p_T cut
- Define a cone radius (R=0.3)
  - p_T trigger = p_T sum of all the associated tracks (secondary seeds) in that cone
- Plot between the highest p_T seed in the cone and associated tracks
  - Subtract flat background for Au+Au
  - Extract Yields:
  - p_T (trigger) = 10 to 12 GeV & 12 to 15 GeV
  - p_T (assoc) = 3 to 4, … ,10 to 11 GeV

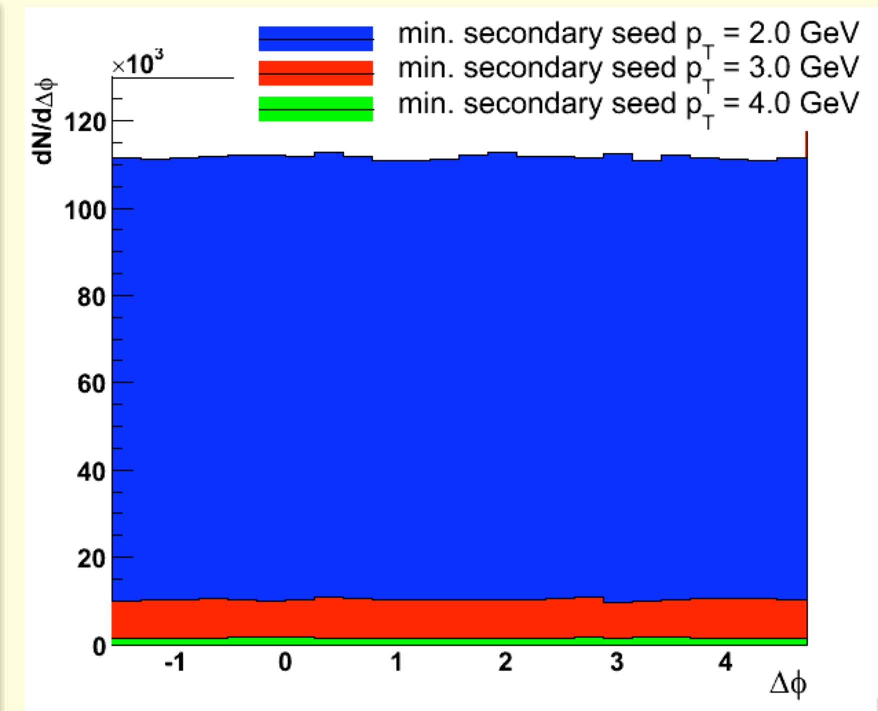
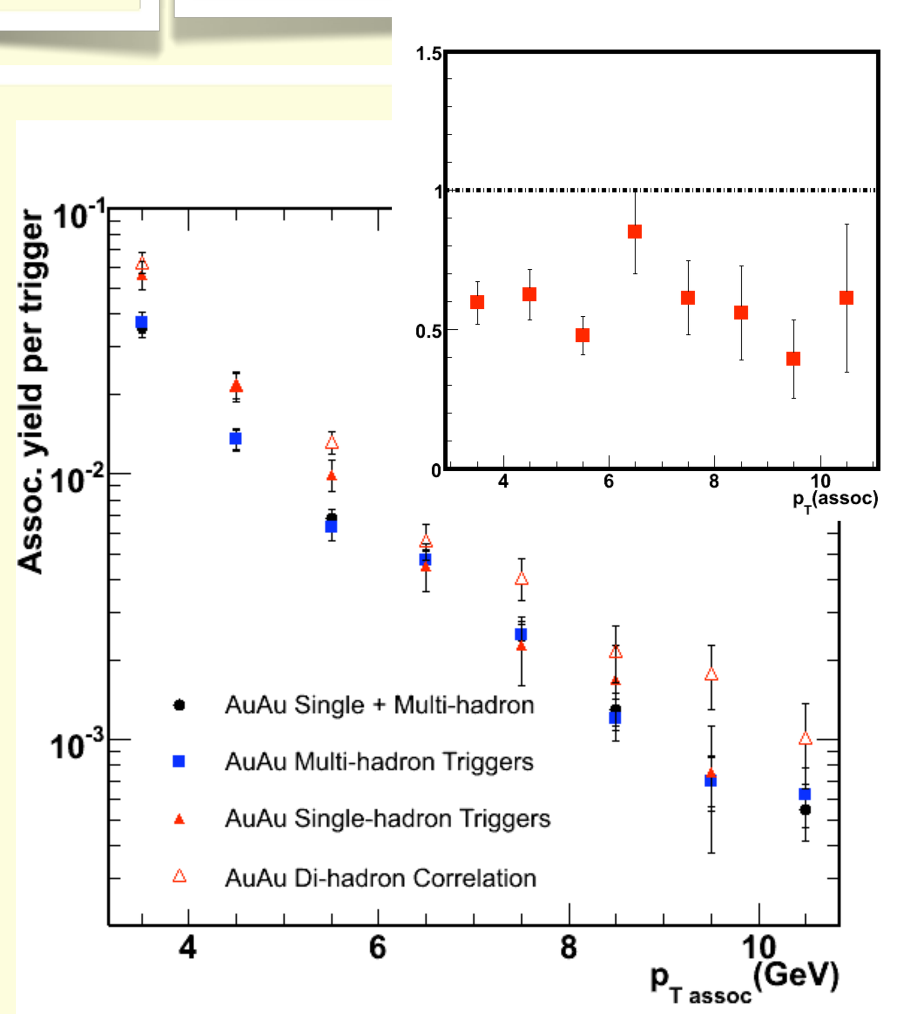


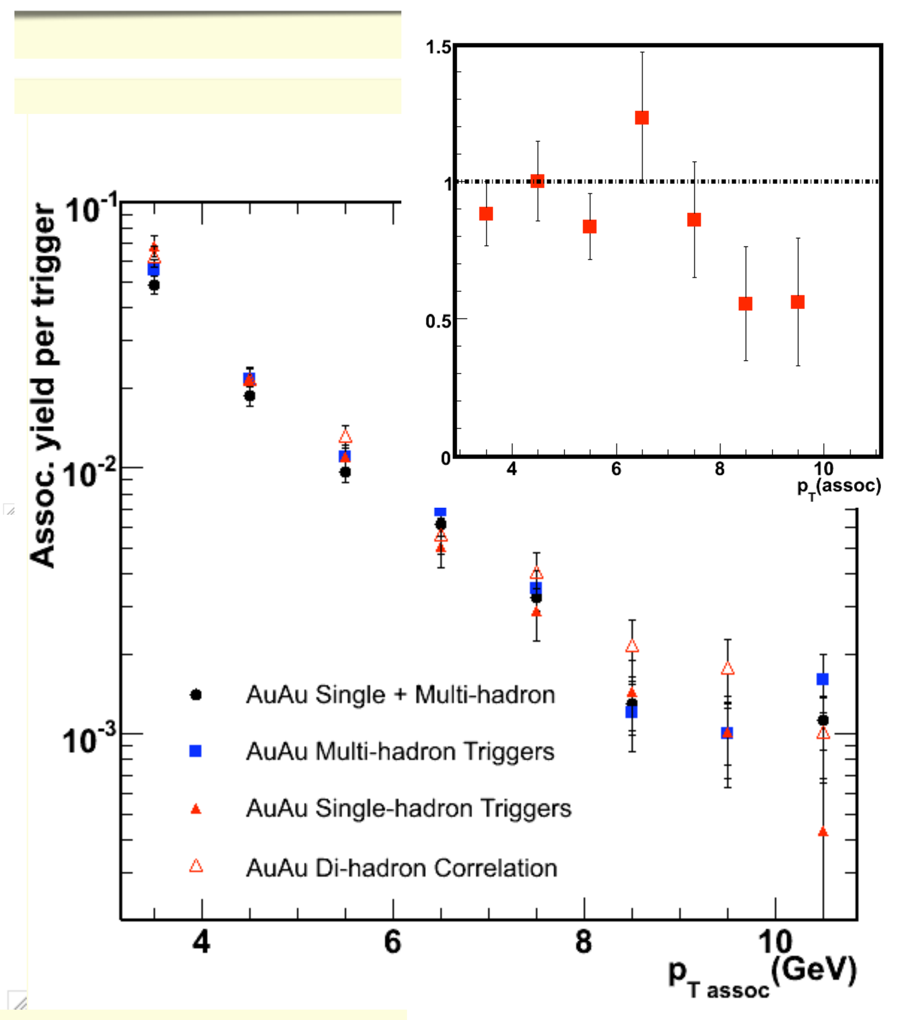
Figure 2: Sample azimuthal correlation as a function of minimum secondary seed p_T. As secondary seed p_T increases, random background decreases.

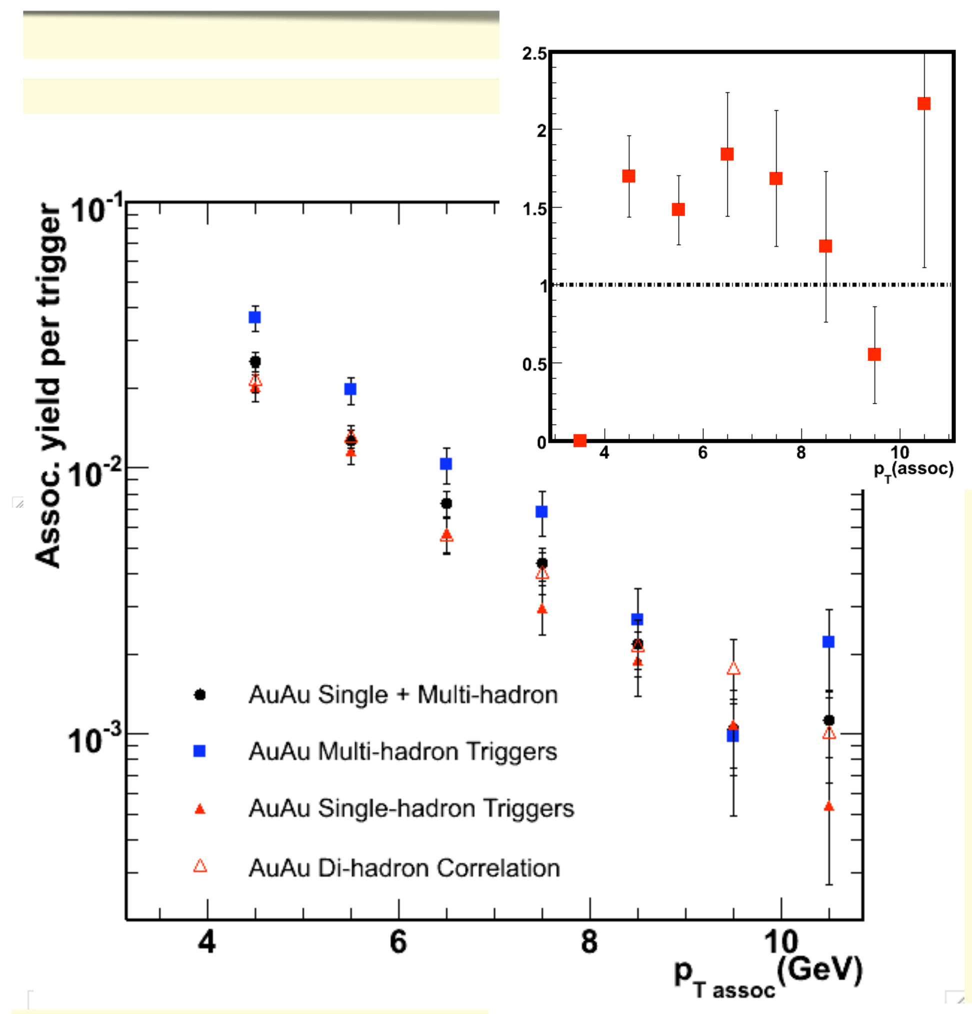
Away Side Yields

10 GeV < $P_{T, Trigger}$ < 12 GeV

We present yields from

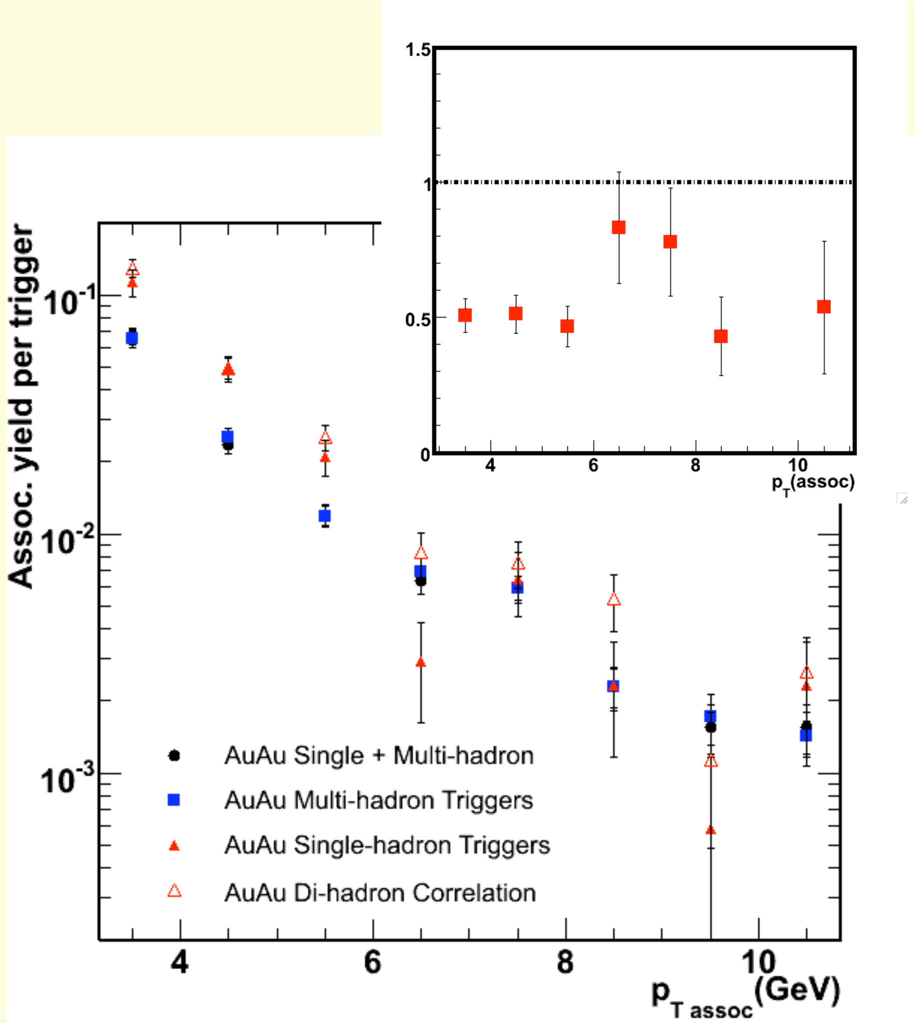


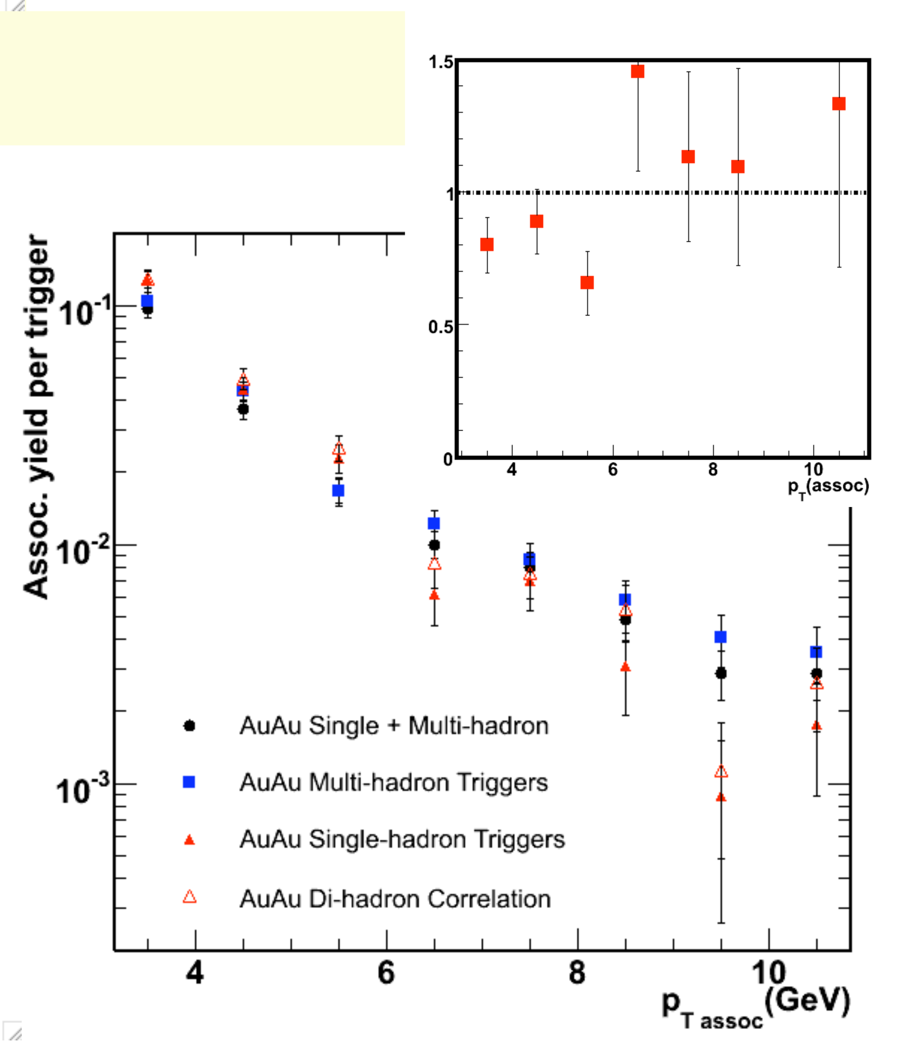


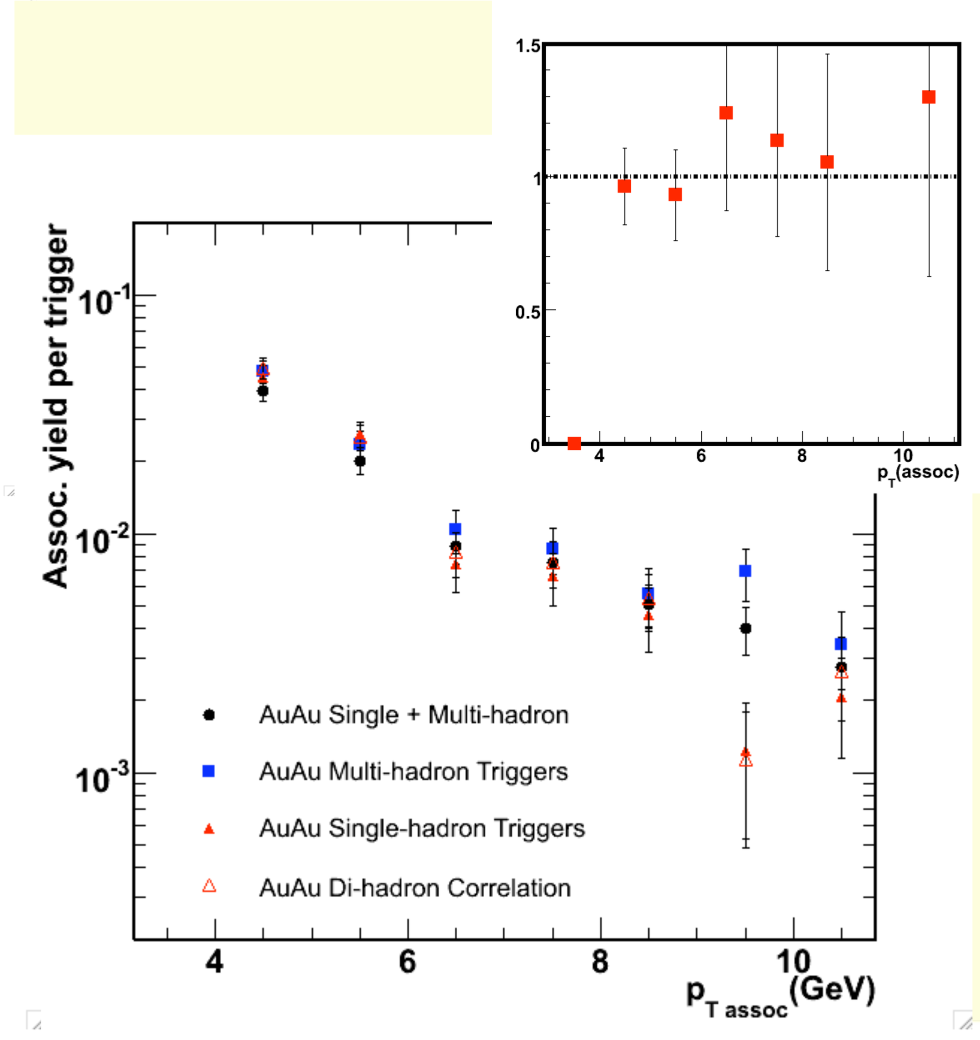


Away Side Yields

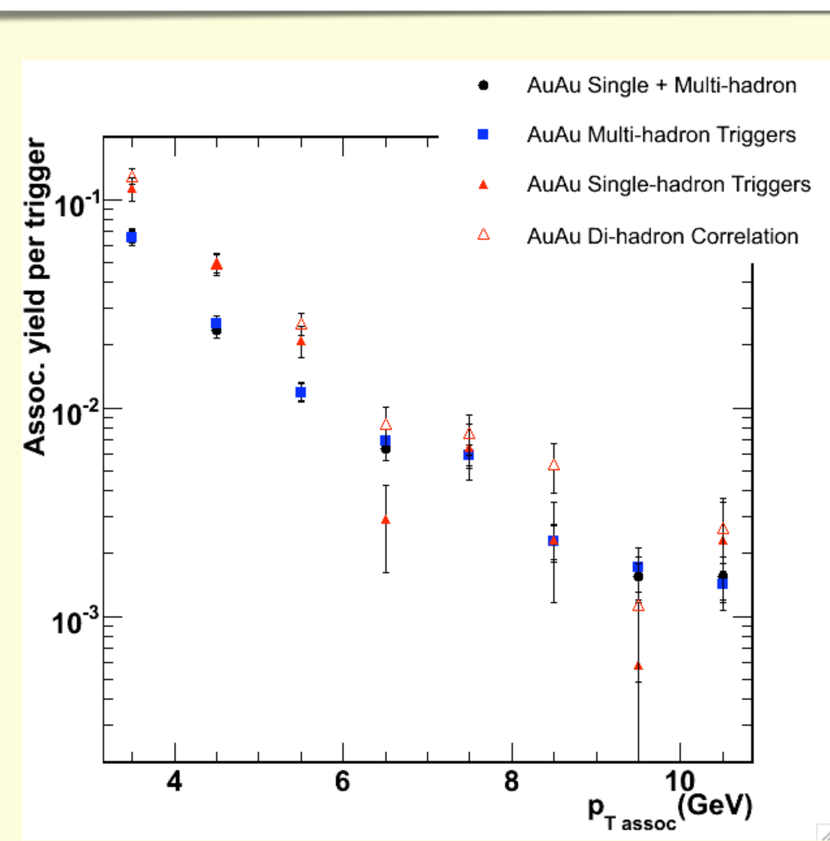
12 GeV < $P_{T, Trigger}$ < 15 GeV







Pythia Simulation Plots



Summary and Conclusions

Investigated Multi-hadron triggers as a method of better approximating fragmentation functions
- Multi-hadron triggers and Di-hadron correlations mostly give very similar results
- Also ratios of Single+Multi-hadron trigger yields to di-hadron yields show slopes not different, kinematics not very different

Multi-hadron triggers yield the same physics as di-hadron correlations with improved statistics
- Method is promising, more work is needed
  - Pythia simulations to understand expectations for multi-hadron trigger yields
  - Study yields for different jet cone radii