Projected Transverse Momentum Distribution in pp colissions at √s=2.76 TeV

A study on the nature of QGP

Objective

- To reproduce and eventually expand on the results of the paper "Measurement of transverse momentum relative to dijet systems in PbPb and pp collisions at $\sqrt{s}$=2.76 TeV".
- This in order to investigate the production of QGP (also called "Colorful Plasma") in these systems

Some terminology

- All analysis is made with respect to the "Dijet Axis", which is the average direction of the Leading Jet and the Subleading Jet with its phi coordinate flipped by pi

- What we refer to as the "Projected pT" (pTll) is the result of:

$$p_T^{||} = -p_T^{trk} cos(\phi_{trk} - \phi_{dijet})$$

- Delta is a quantity similar to R in the Jet reconstruction, and thus is given by:

$$\Delta = ((\eta_{trk} - \eta_{dijet})^2 + (\phi_{trk} - \phi_{dijet})^2)^{1/2}$$

- The asymmetry ratio Aj is given by:

$$A_J = \frac{p_{T_{leading}} - p_{T_{subleading}}}{p_{T_{leading}} + p_{T_{subleading}}}$$

Results

- The jets were reconstructed using the anti-kT algorithm with R = 0.4

- We then calculated pTll and delta for each charged final particle, made cuts in pT and delta (pT<300, delta<1.8), and stored the selected data

- The presented histograms show pTll sorted by Aj in several multiplicity ranges with inclusive pT, which is given by equation 6.6 in the paper

Breakdown of equation 6.6

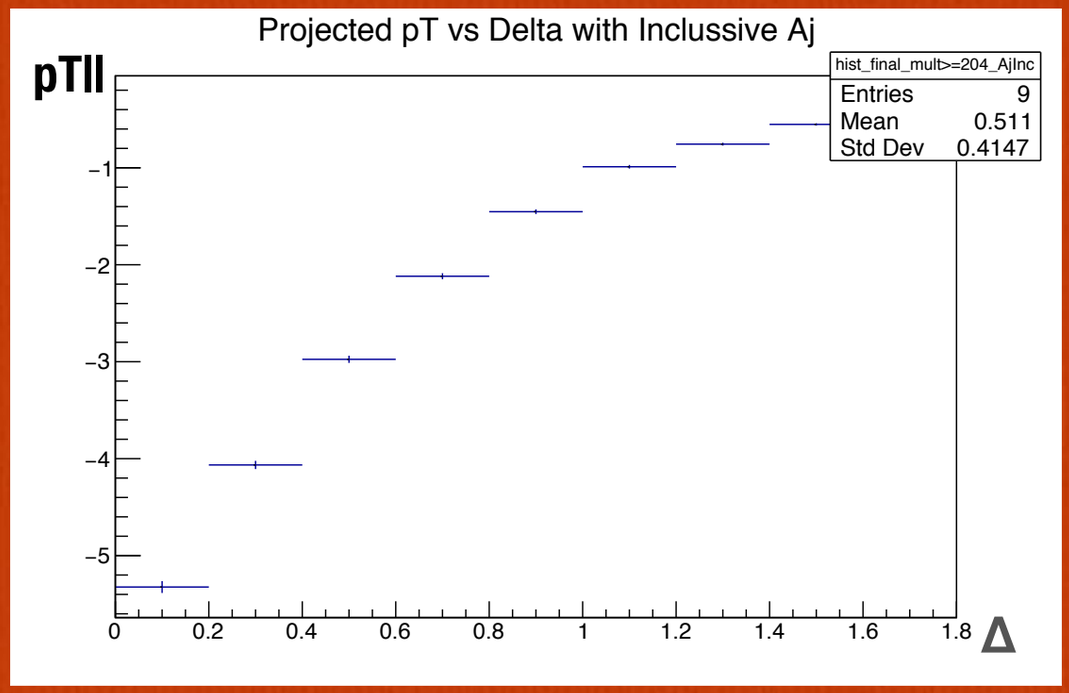
$$p_T^{||} = -p_T^{trk} cos(\phi_{trk} - \phi_{dijet})$$

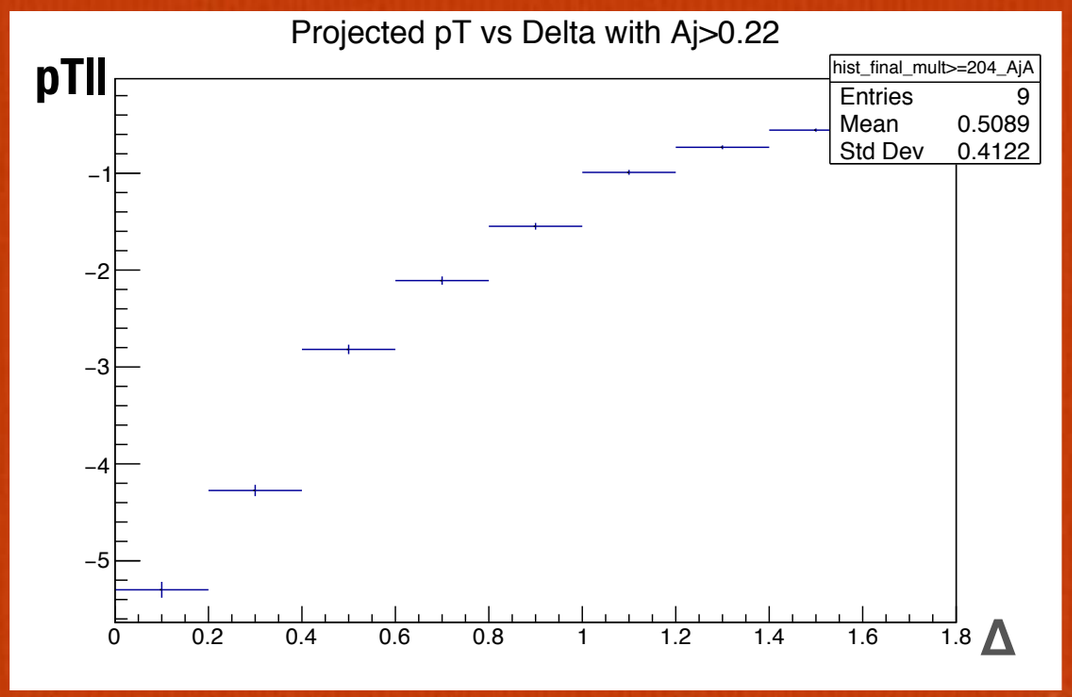
$$\frac{1}{N}\sum_{n}^{N}(p_T^{||})_{n,\Delta,p_T^{trk}} = \left\langle \not{p}_T^{||} \right\rangle_{\Delta,p_T^{trk}}$$

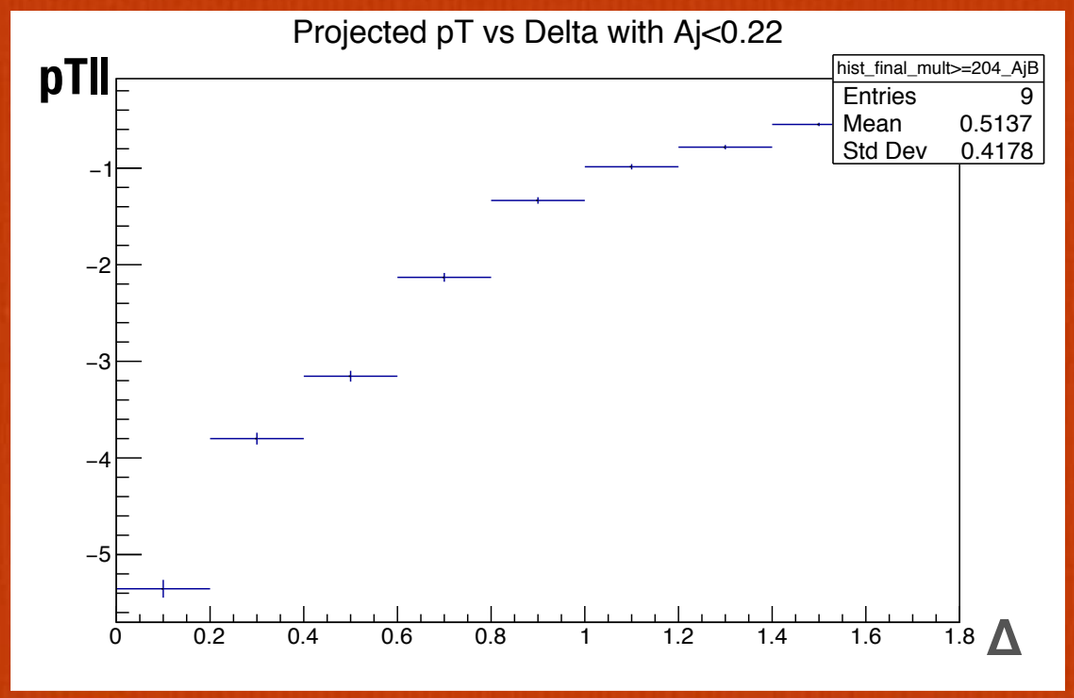
N tracks in every delta ring in every pT interval

$$\sum_{\Delta'=0}^{\Delta'=\Delta}\sum_{p_T^{trk}} \left\langle \not{p}_T^{||} \right\rangle_{\Delta',p_T^{trk}} = \left\langle \not{p}_T^{||} \right\rangle_{[0,\Delta]} \quad \textbf{(6.6)}$$

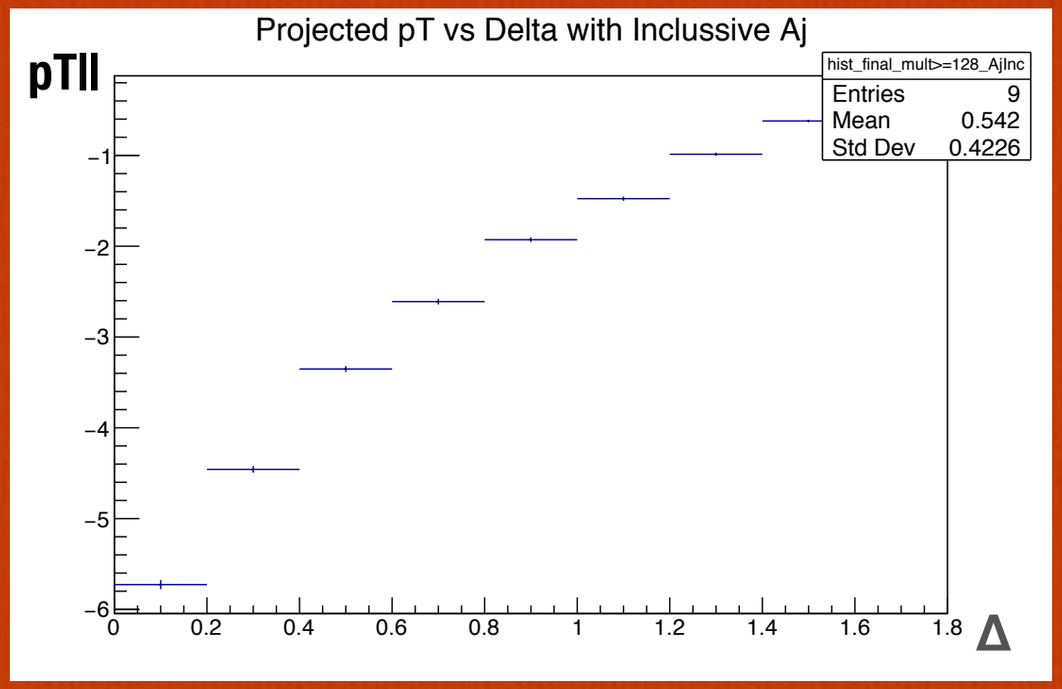
Events in the 10% higher multiplicity range

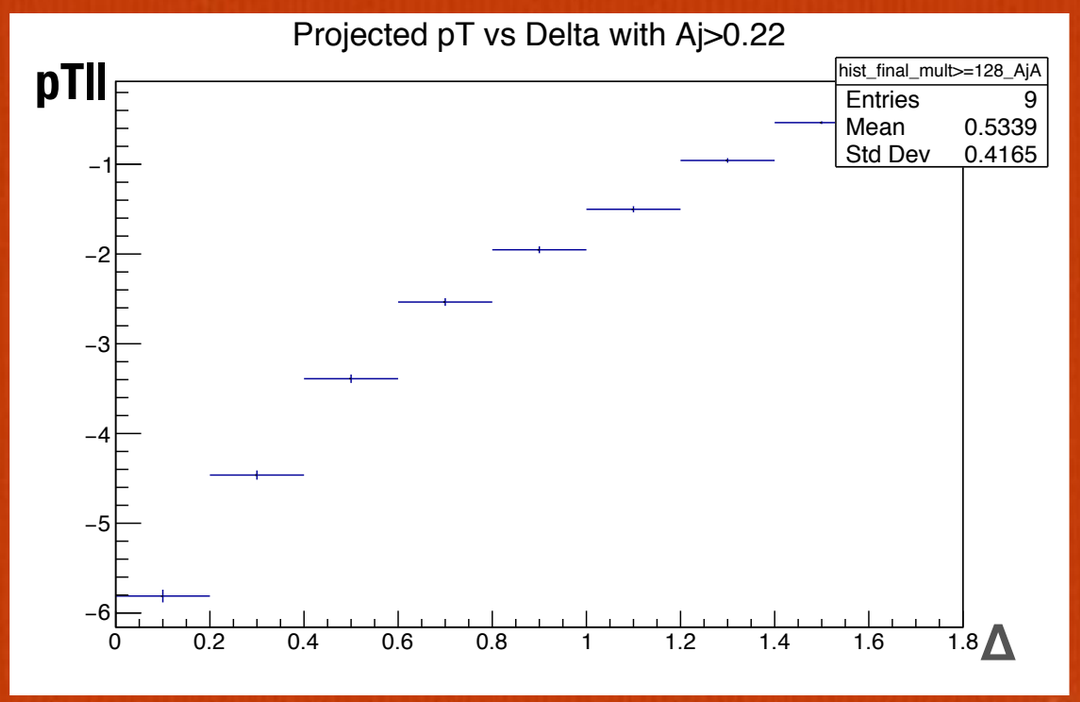


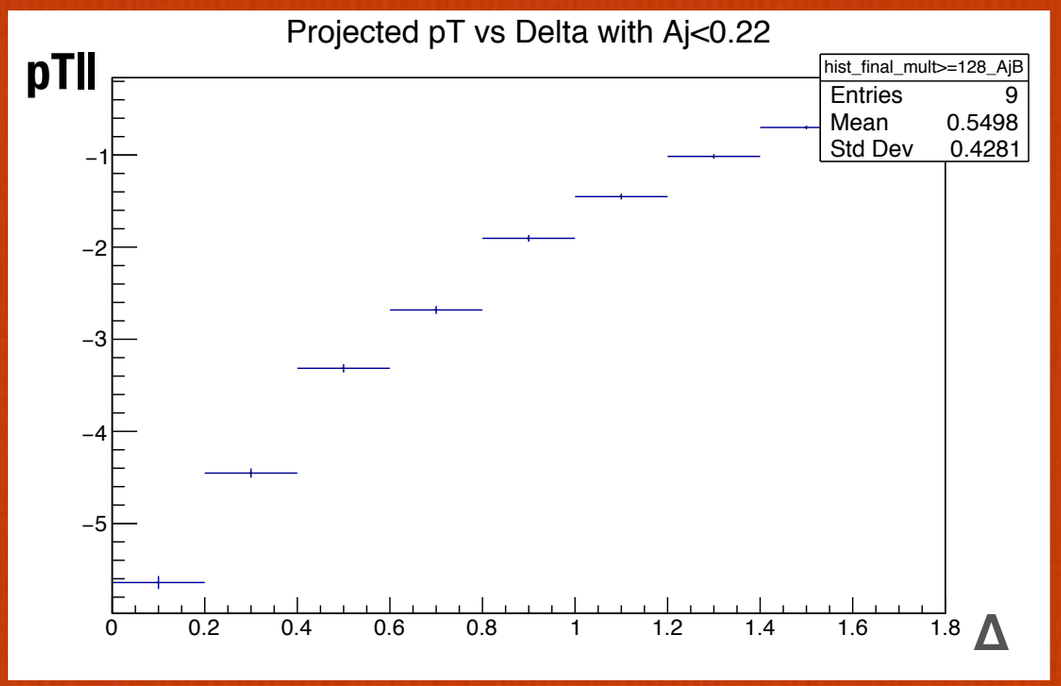




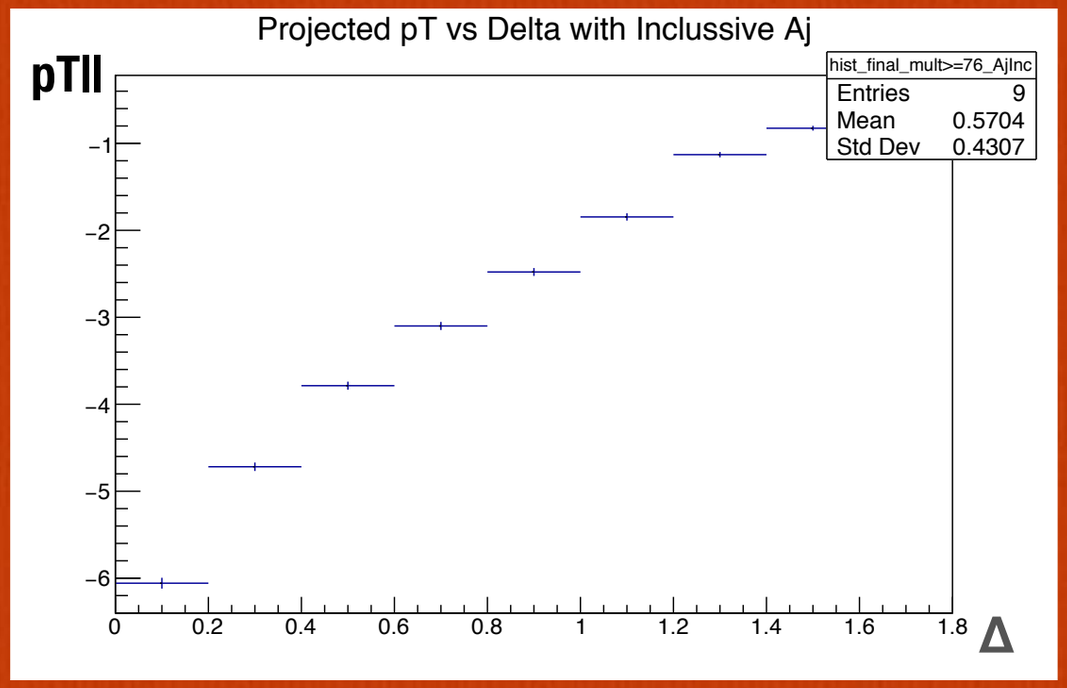
Events in the 50% higher multiplicity range

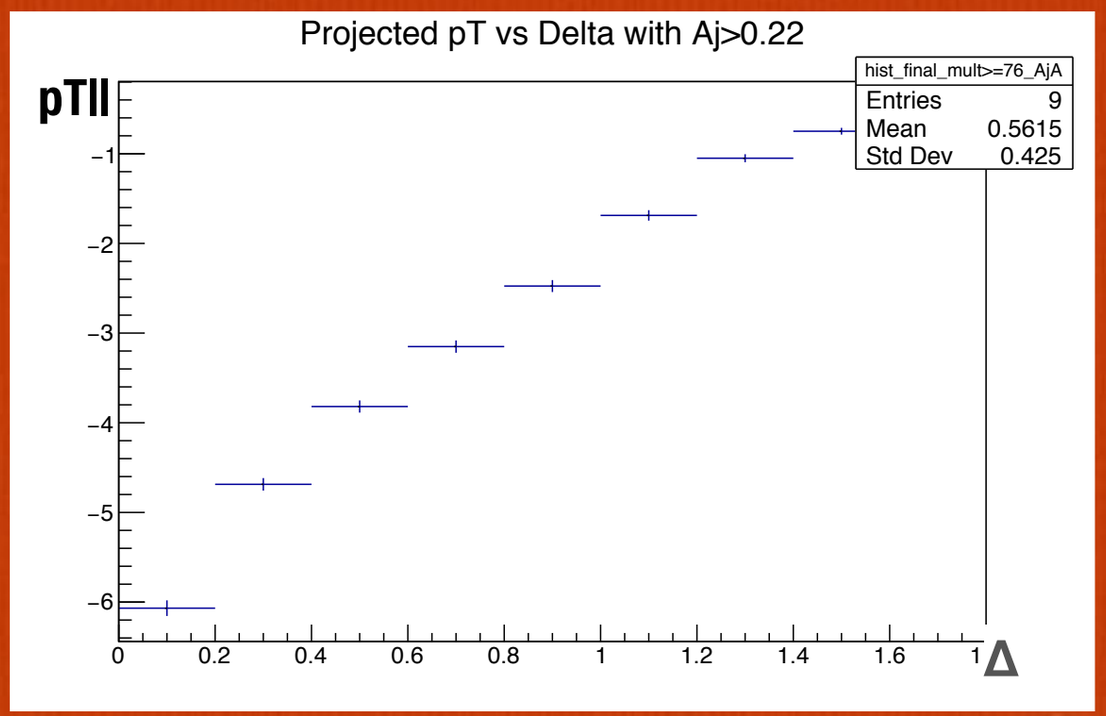


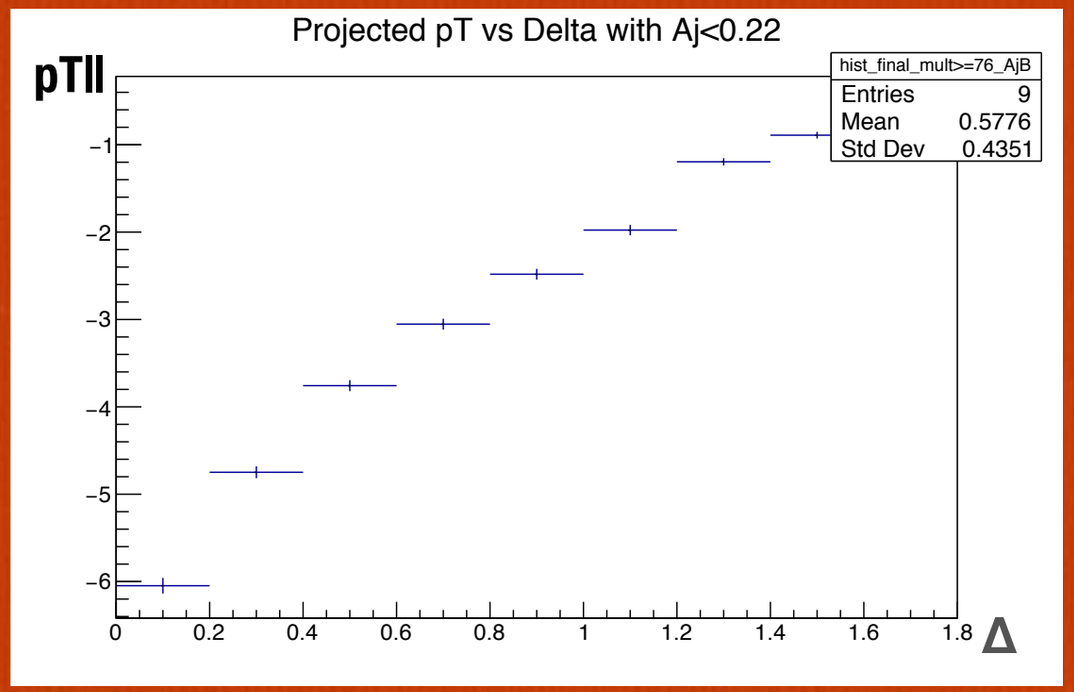




Events in the 90% higher multiplicity range







What's next?

- ☐ Separate the contributions by pT range to get more insightful data
- ☐ Run simulation without color reconnection
- ☐ Compare both simulations
- ☐ Analyze what the results mean for the nature of QDP (Colorful Plasma)