Two-Particle Correlation Updates

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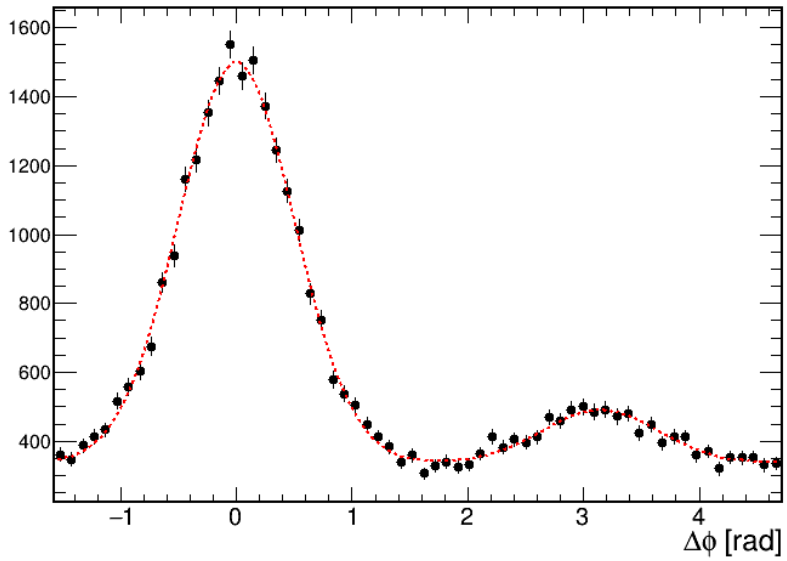
An Important Lesson I Had to Learn

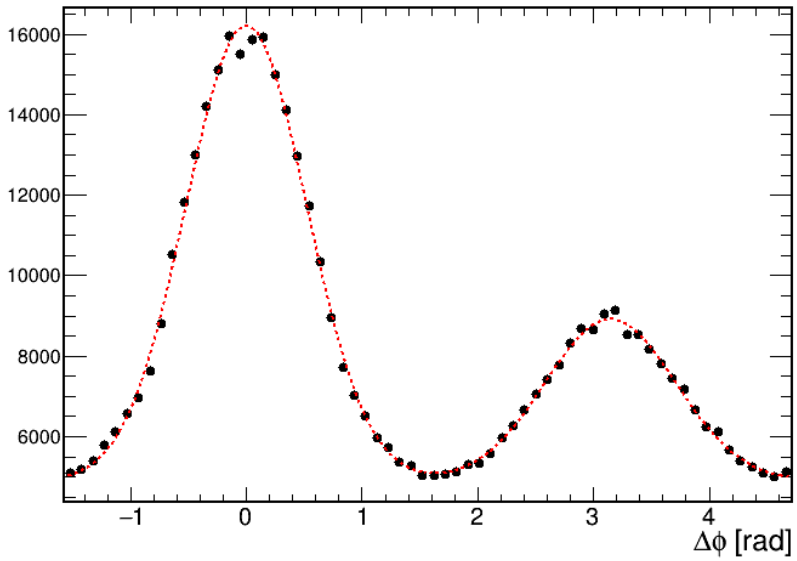
- In DIS, the dijet production processes relative to single jet production is largest at low Q^2.
- I had been focused on $Q^2 > 100$ GeV^2, which is completely dominated by single jets events unless one make a pretty severe y cut.
- This is better since dihadron correlations can be used to scan across Q_{sat}, which is expected to be of order 1.

Dihadron Correlations from `prod.2`

- I will show results from `DJANGOH` and `PYTHIA6` from the June detector concept.
- Running over the track eval ntuples only.
- Pair all tracks that match to truth particle with $p_T > 1$ GeV, $|\eta| < 3$
- In all cases $p_T^{\text{trig}} > p_T^{\text{assoc}}$
- The scattered electron is excluded from the analysis.
- I boost to the head-to-head frame and report $\Delta\phi$ distributions in that frame.

Two-Particle Correlations at low Q^2

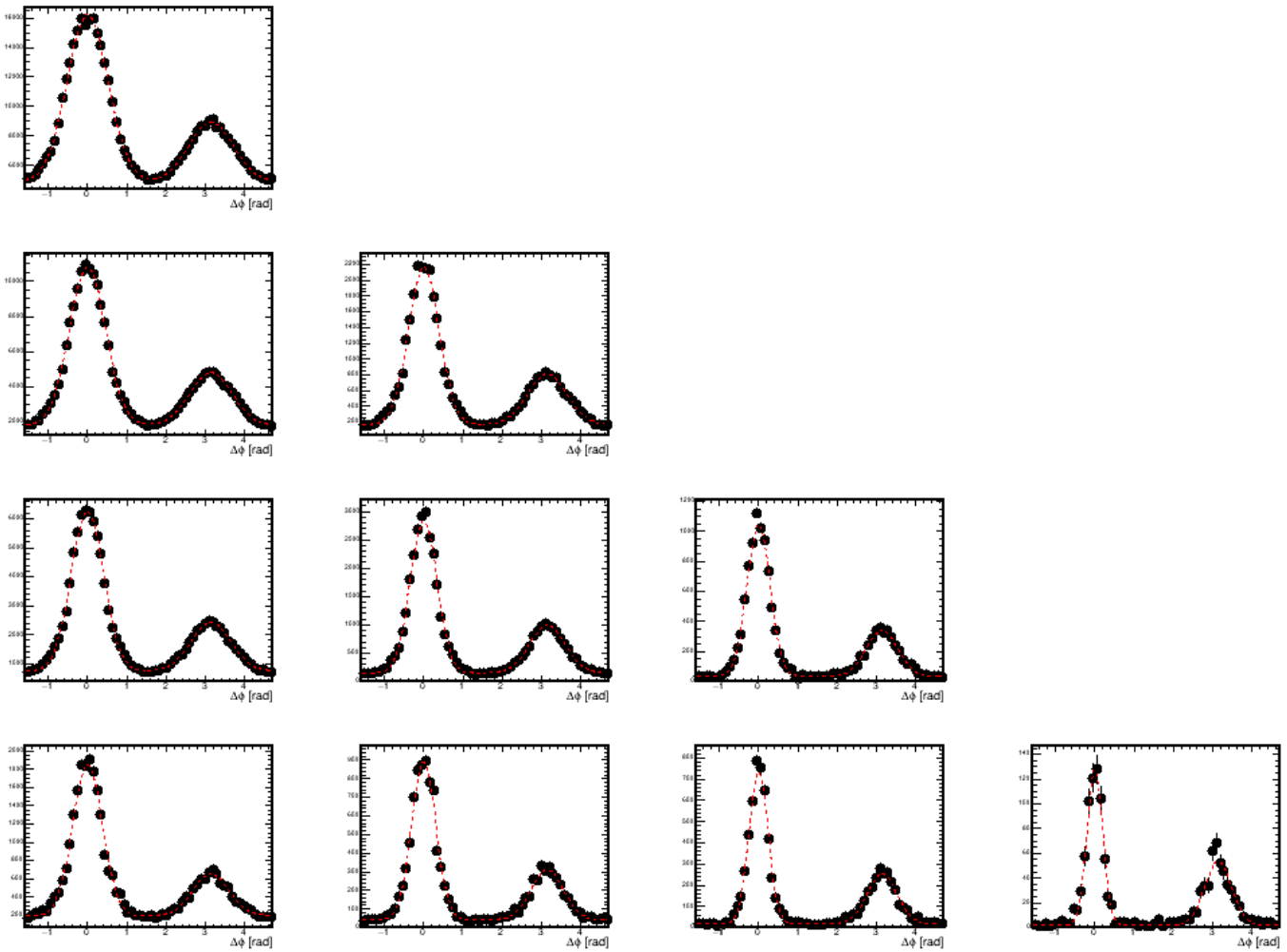




- Reconstructed tracks with $1 < p_T^{\mathrm{assoc}} < p_T^{\mathrm{trig}} < 1.5$ GeV/c matching truth particles
- 10x100 GeV beam energy
- Left: 1 M DJANGOH $Q^2 > 2$ GeV^2
- Left: 20 M PYTHIA6 $Q^2 > 1$ GeV^2
- Double Gaussian fit does very well.

Two-Particle Correlations at low Q^2

10x100 GeV PYTHIA6 with $Q^2 > 1$ GeV^2 two-particle correlations



1-1.5, 1.5-2, 2-3, 3-5 GeV p_T bins trigger increases down, associated increases right

Plan for Final Plots

- One plot of a two-particle correlation comparing truth to reco tracks.
- One plot of $e + p$ correlations compared to $e + A$ using EPS09 weighting.
- Starting to develop code to run over the EventEvaluator ntuples since I need
  - Access to truth charged hadrons
  - Access to x and Q^2 for EPS09 weighting
- Will focus on PYTHIA6 $Q^2 > 1$ GeV^2 for each of the beam energies.
- Move July Detector Concept
  - 18x100 GeV $Q^2 > 1$ GeV^2 14M produced
  - 18x275 GeV $Q^2 > 1$ GeV^2 20M produced