Two-Particle Correlation Updates

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Dihadron Correlations from `prop.2` and `prop.4`

- ▶ Analyzed `PYTHIA6` low-Q^2 SIDIS events
- ▶ June Detector Concept
  - ▶ `ep-5x41-q2-low`, `ep-10x100-q2-low`, `ep_18x100lowq2`, `ep-18x275-q2-low`
  - ▶ Approximately 20M events in each
- ▶ July Detector Concept
  - ▶ `ep-10x100-q2-low`, `ep-18x275-q2-low`
  - ▶ Approximately 20M events in each
- ▶ Analyzing the `EventEvaluator` ntuples
- ▶ Considering events with $Q^2 > 1$ GeV^2, and particles with $p_T > 1$ GeV, $|\eta| < 3$
- ▶ Pair all generated $\pi^\pm$, $K^\pm$, and $p/\bar{p}$
- ▶ Pair all tracks that match to truth particle
- ▶ In all cases $p_T^{\mathrm{trig}} > p_T^{\mathrm{assoc}}$
- ▶ The scattered electron is excluded from the analysis.
- ▶ I boost to the head-to-head frame and report $\Delta\phi$ distributions in that frame.

Comparison of Generated and Reconstructed Correlations: June Detector Concept
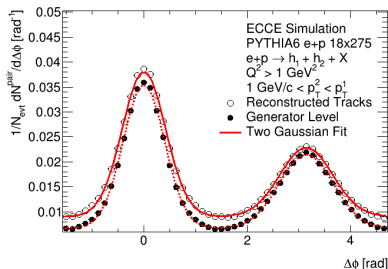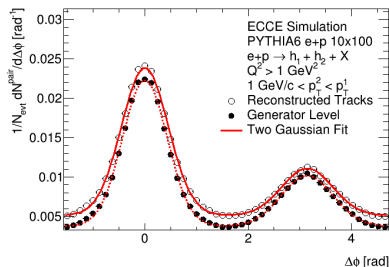

- ▶ Invariant yield of hadron pairs at the generator level (closed points) and the reconstructed level (open points)
- ▶ Fit to flat + near-side Gaussian + away-side Gaussian
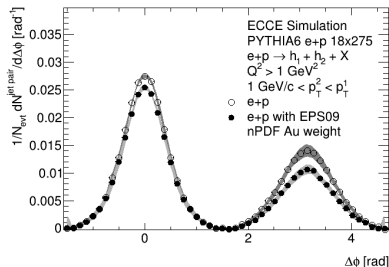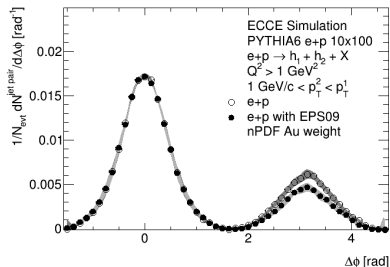
Dijet Correlations: June Detector Concept
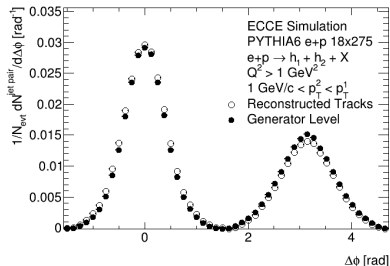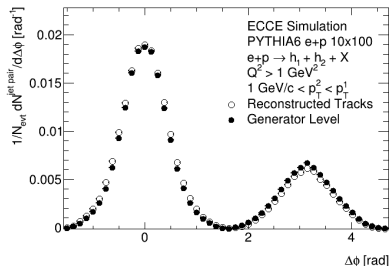
- ▶ Invariant yield of hadron pairs at the generator level (closed points) and the reconstructed level (open points) after subtracting flat background.
- ▶ Small differences between generated and reconstructed.

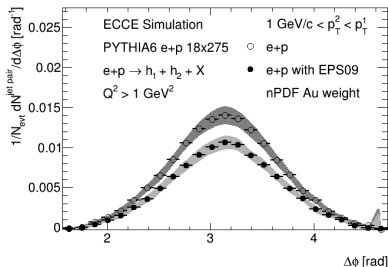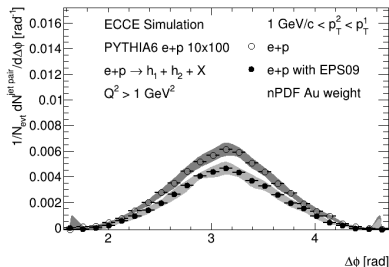# Weighting with nPDF to mimic e+Au: June Detector Concept
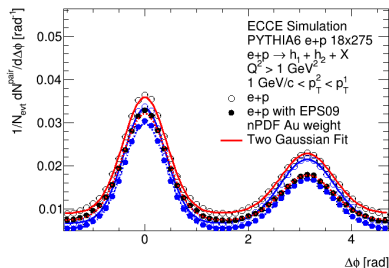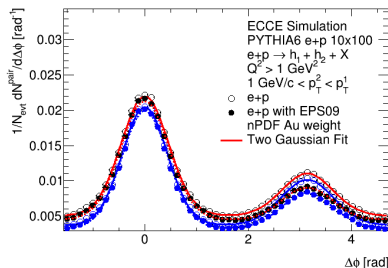
- ▶ Half the statistics unweighted (open points). Half the statistics weighted with EPS09 $R^i(x, Q^2)$ (closed points).
- ▶ Generator level (blue) and Reco level (black)

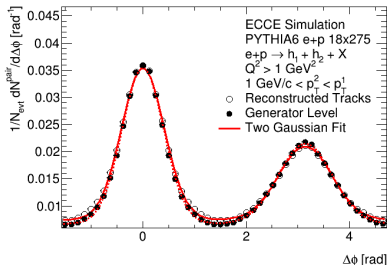# Weighting with nPDF to mimic e+Au, Jet Correlations: June Detector Concept


- ▶ Dijet correlations after subtracting flat background.
- ▶ Grey band indicates difference between generator-level and reco-level correlations
- ▶ e+Au away-side suppression is larger than systematic difference between reco and generator.

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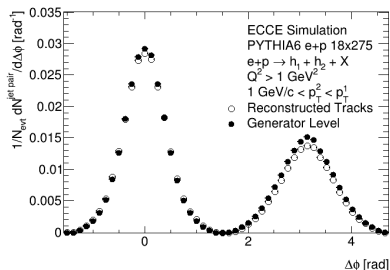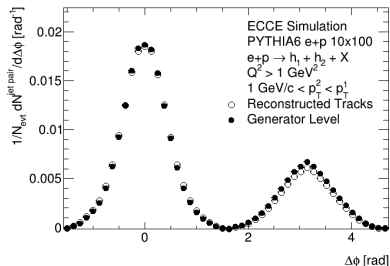
Comparison of Generated and Reconstructed Correlations: July Detector Concept
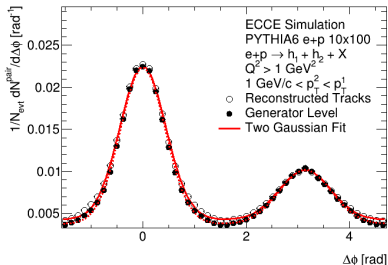
- ▶ Invariant yield of hadron pairs at the generator level (closed points) and the reconstructed level (open points)
- ▶ Fit to flat + near-side Gaussian + away-side Gaussian
- ▶ Much less combinatorial differences between reco and generator level raw correlations.
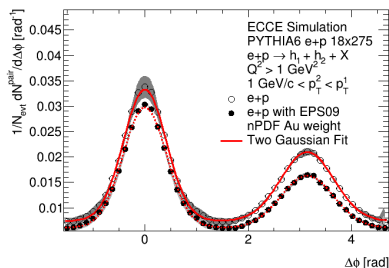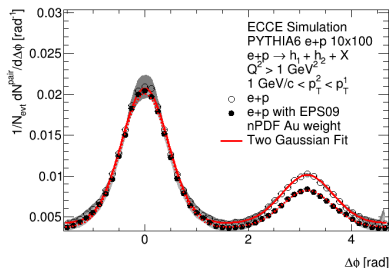
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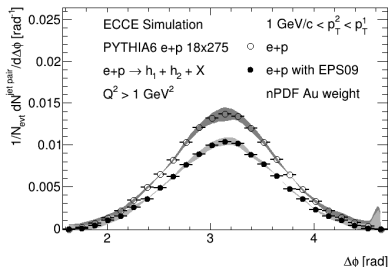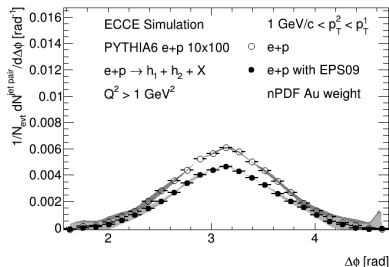# Weighting with nPDF to mimic e+Au: July Detector Concept

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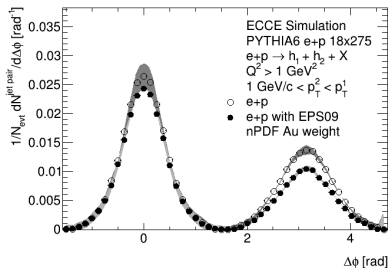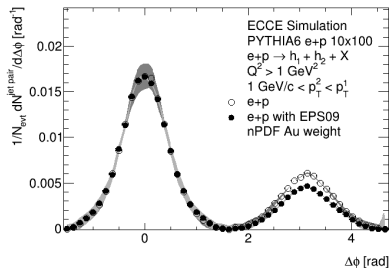
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Outstanding Questions

- SIDIS `pythia6` DSTs for 5x41 and 18x100 are available but no `EventEvaluator` ntuples. Will those be produced?
- What is the right normalization for these plots.
    - Does 1/Nevt make sense?
    - Should it be per trigger so it is closer to a ratio of cross sections?
    - Should it simply be an arbitrarily normalized correlations since we only care about the shape?