Preliminary electron ID performance

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ePIC inclusive PWG meeting

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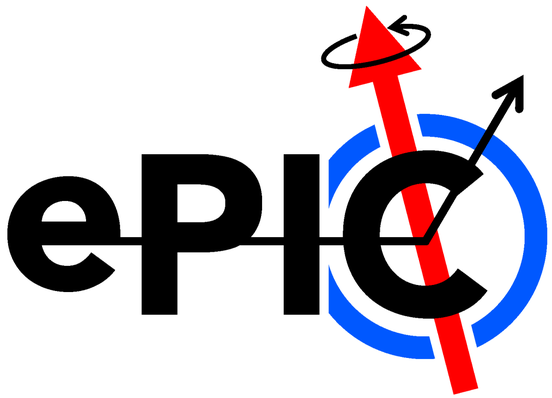


Currently implemented electron ID

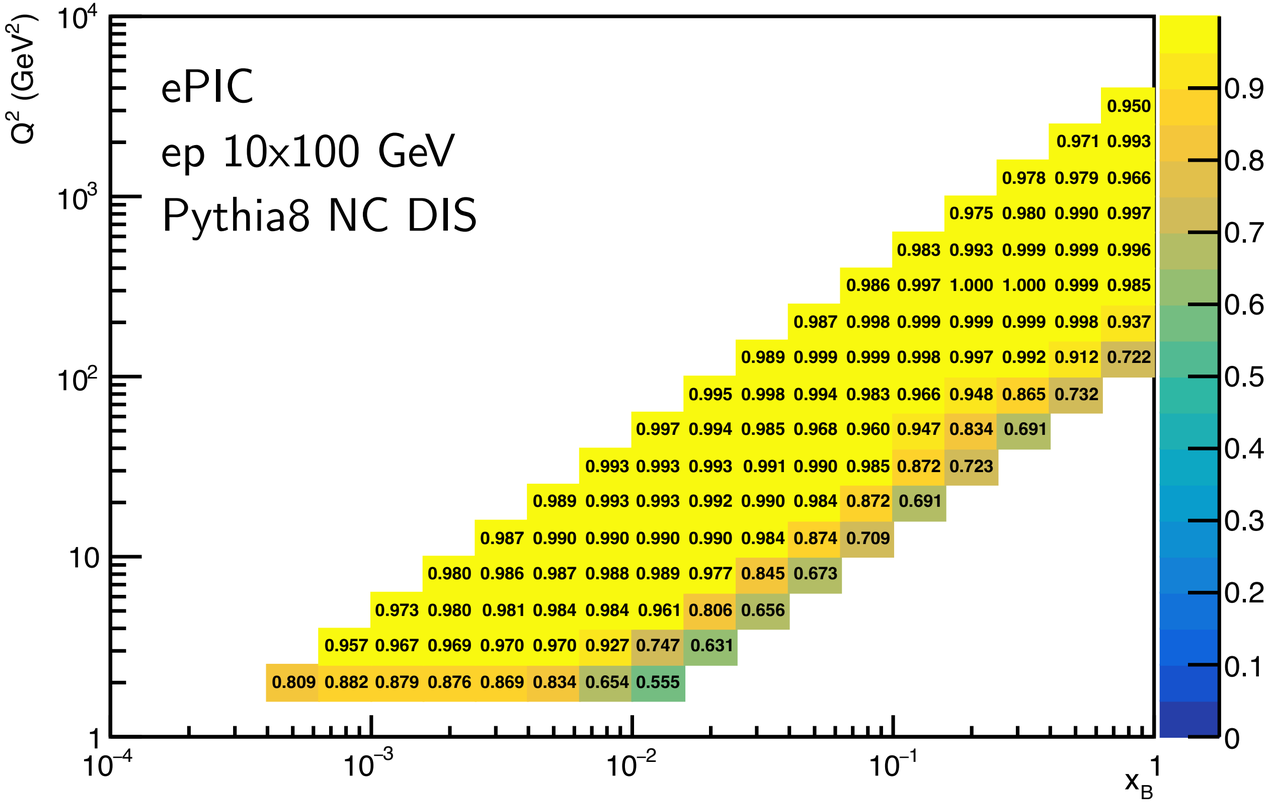
- Start from reconstructed particles with negative charge
- Select particles with $0.9 < E/p < 1.2$
  - Reconstructed E and p
  - Truth track-cluster matching
- Take electron with largest $E - p_z$
  - Reconstructed E and p
  - Truth (hadron) PID

- Evaluating performance
  - How often does reconstruction-based electron ID (eID) select same particle as truth-based electron ID (true ID)?
  - What is the impact of eID on acceptance?

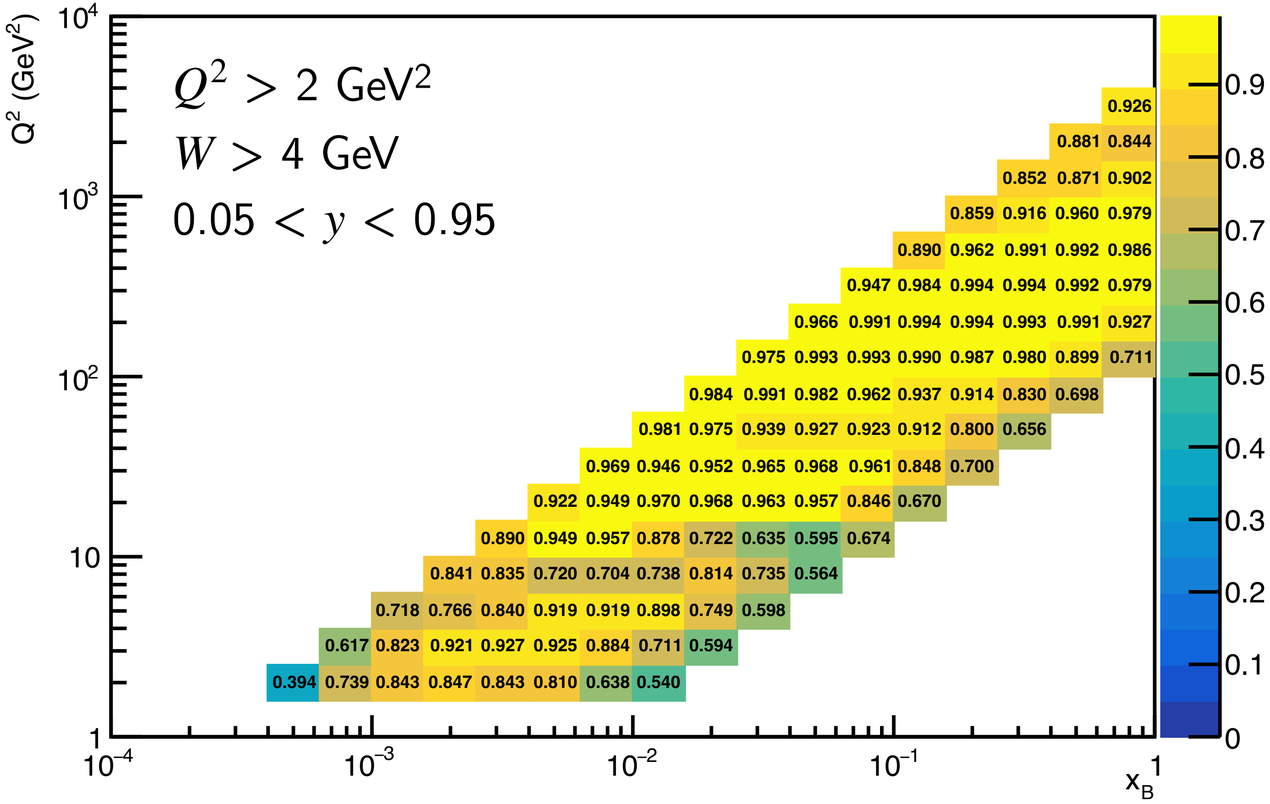
Acceptance (10x100 GeV, electron track)

$$C_{acc} = \frac{N_{rec}(x_{gen}, Q^2_{gen})}{N_{gen}(x_{gen}, Q^2_{gen})}$$

True ID



eID

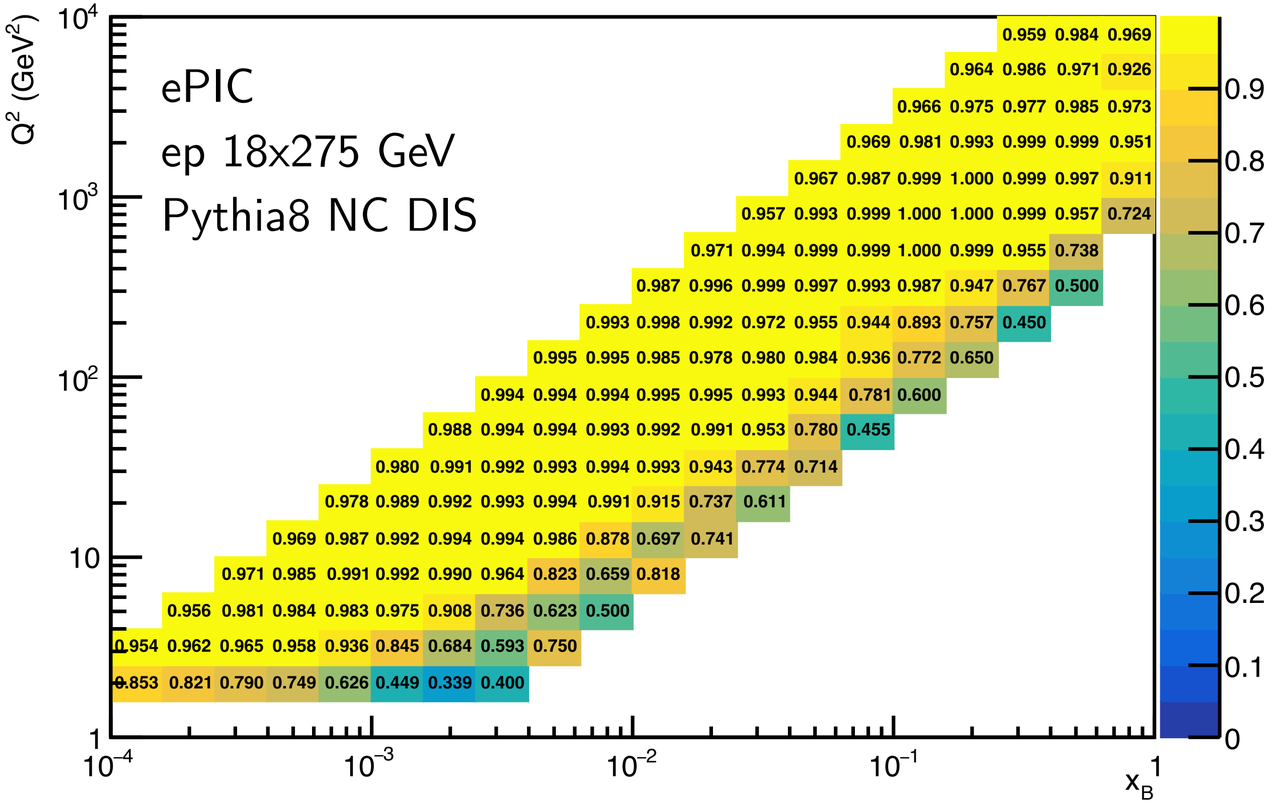


eID identifies truth electron in 87.4% of events

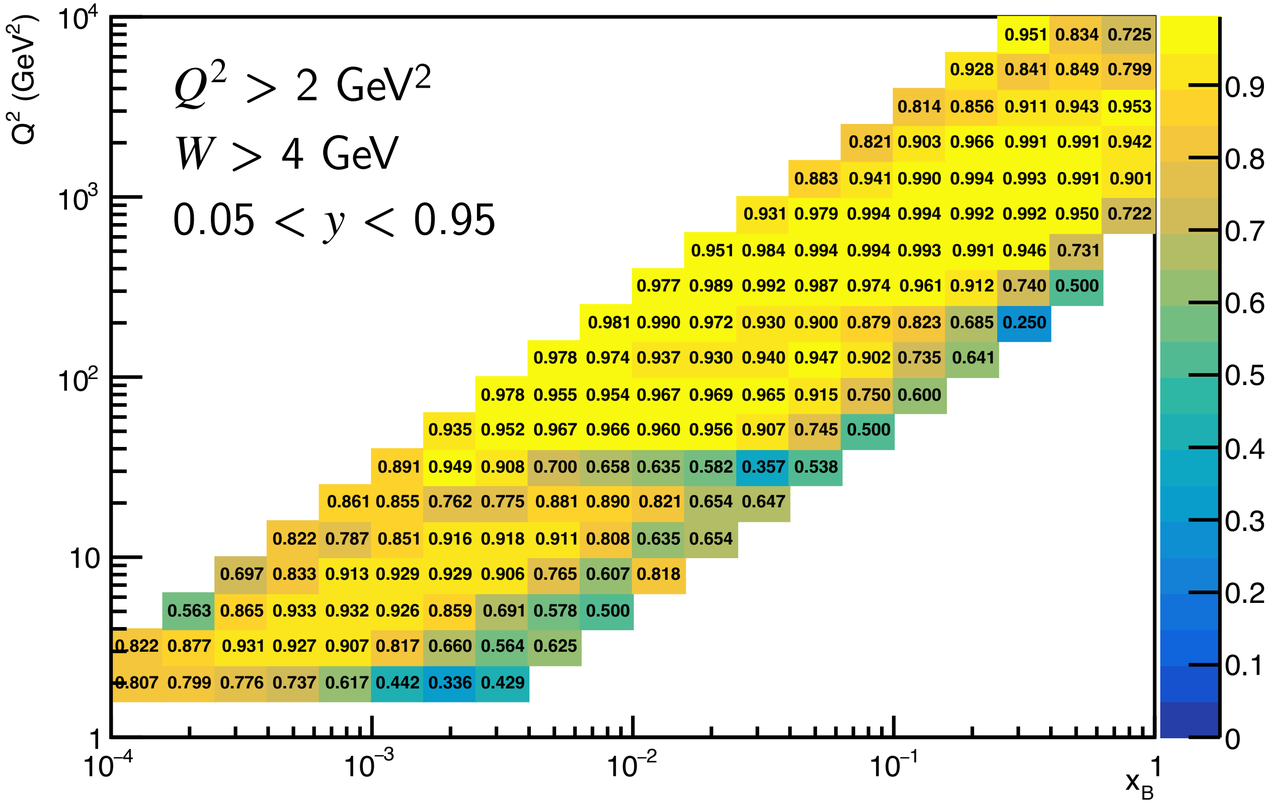
Acceptance (18x275 GeV, electron track)

$$C_{acc} = \frac{N_{rec}(x_{gen}, Q^2_{gen})}{N_{gen}(x_{gen}, Q^2_{gen})}$$

True ID



eID



eID identifies truth electron in 87.8% of events

Next steps

- Preliminary eID has nearly 90% success rate, but still relies on some truth information

- Further comparisons of eID/truth ID
  - Bin purity/stability, kinematic resolutions, reduced cross sections
  - Should be more progress on this before Wednesday's joint physics/software meeting
- Improving eID
  - Continue working towards completely reconstruction-based algorithms
  - Optimize existing cuts on E/p, $E - p_z$
  - Implement new cuts (e.g., calorimeter shower shape)