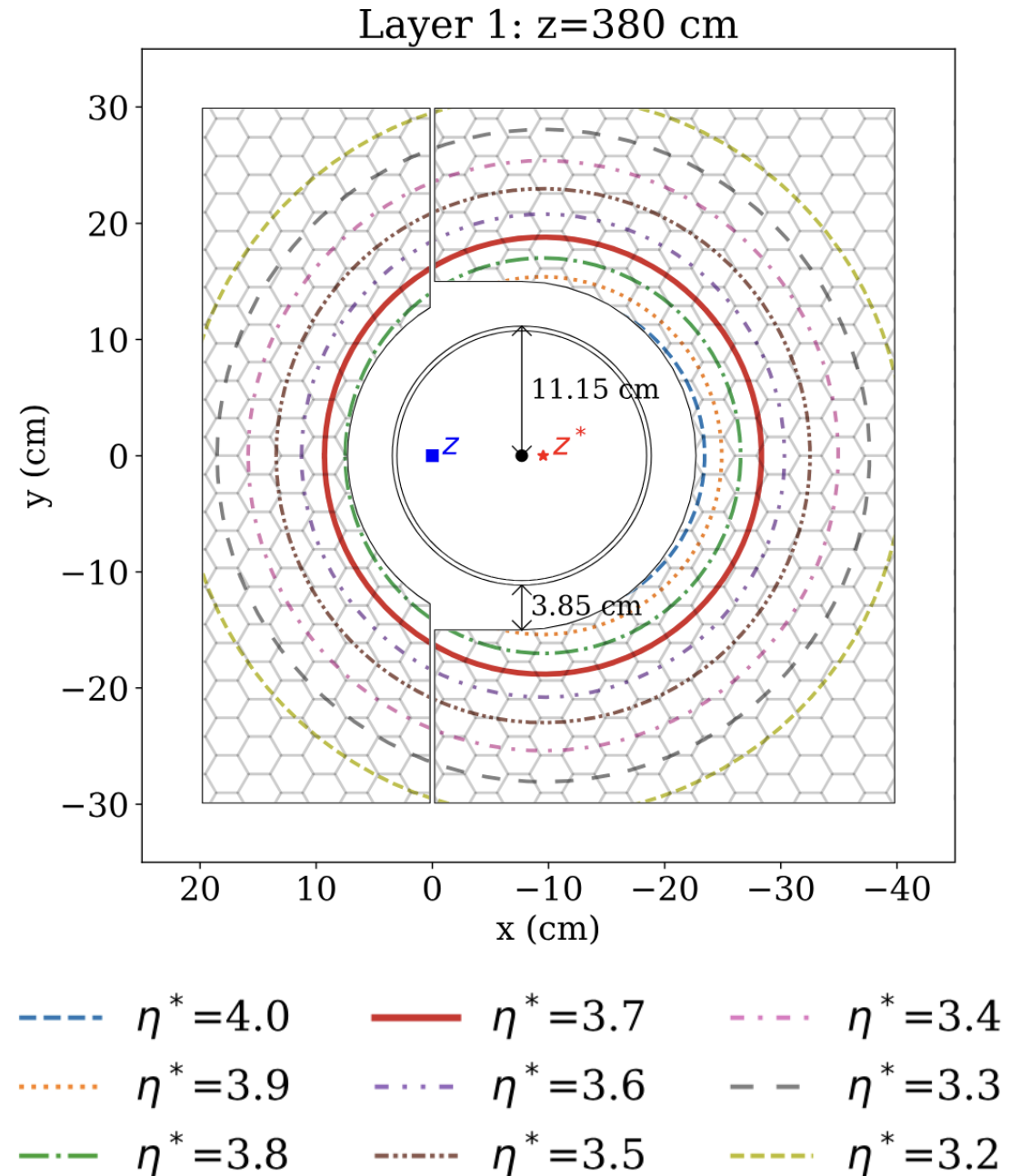# Insert Jet Studies Update

Sean Preins

9/9/25

- Insert covers eta range of 3 – 4
- Analyzed 315k events with min Q2 = 1
- Combines clusters from the LFHCAL, ECal endcap, and ECal + HCal insert
- Jets are defined using anti-kt algorithm with R = 0.4
- Reco level cuts:
  - Min cluster E = 1.5 GeV
  - 3 < eta < 4.5
  - Min jet E = 25 GeV
- Truth level cuts:
  - 3 < eta < 4
  - Min jet E = 30 GeV

- Truth and reco jets are paired by their proximity in eta-phi space
- Max dR = 0.4 (one jet radius)
- 1-to-1 jet matching is enforced
- 1M events
- Total truth jets: 30757
- Total reco jets: 28924
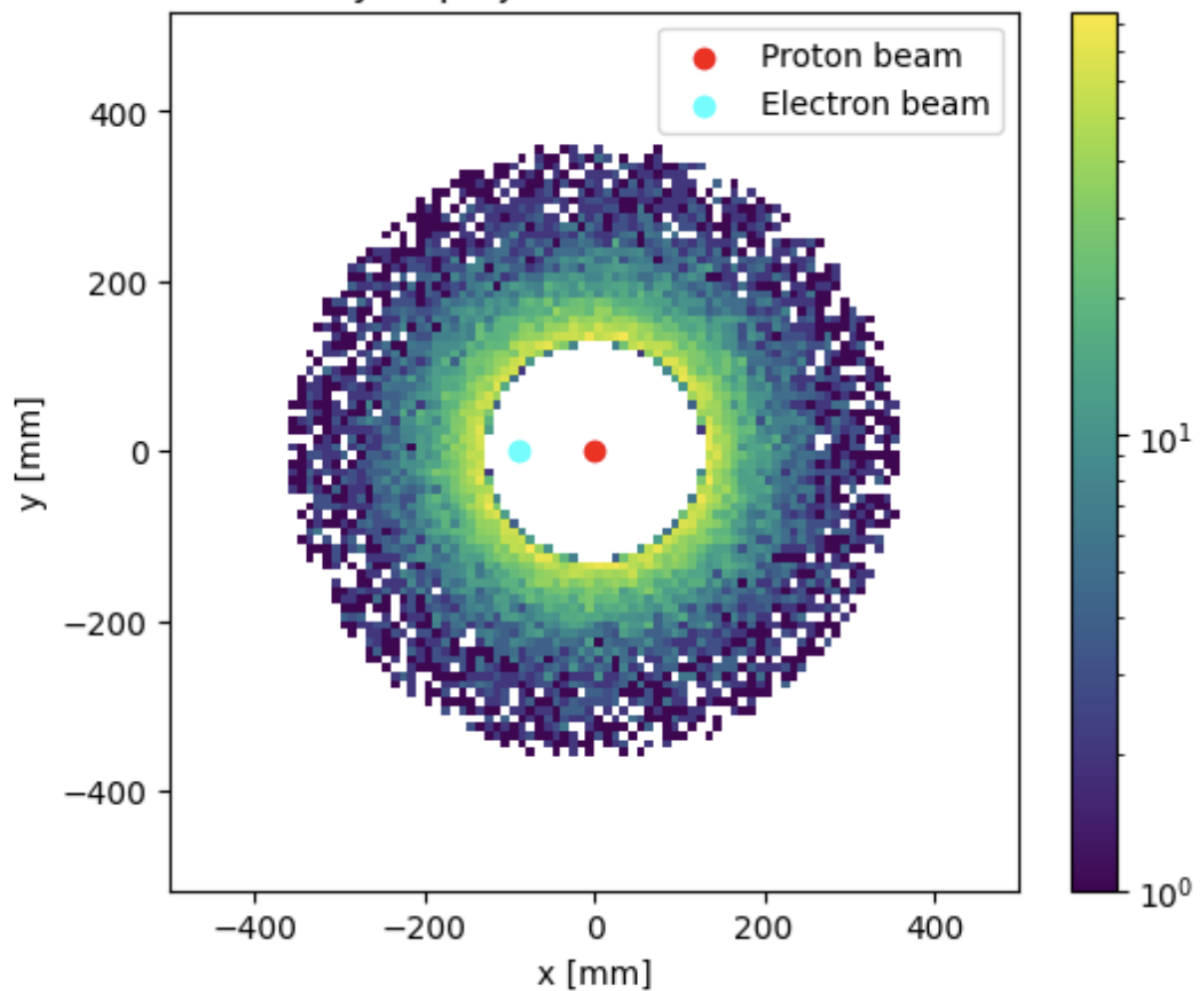- Total matched jets: 13671
- Jet matching efficiency: 47%
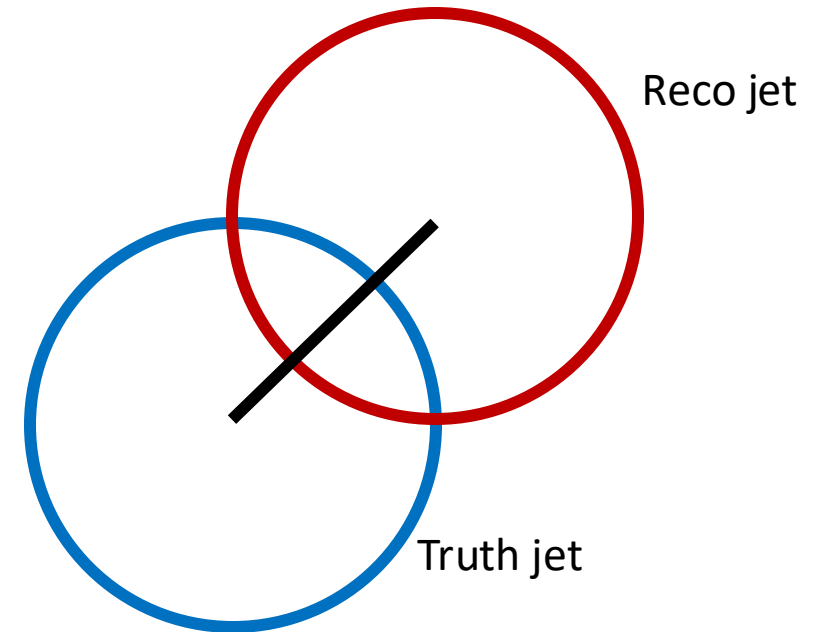
Reco jet

Truth jet

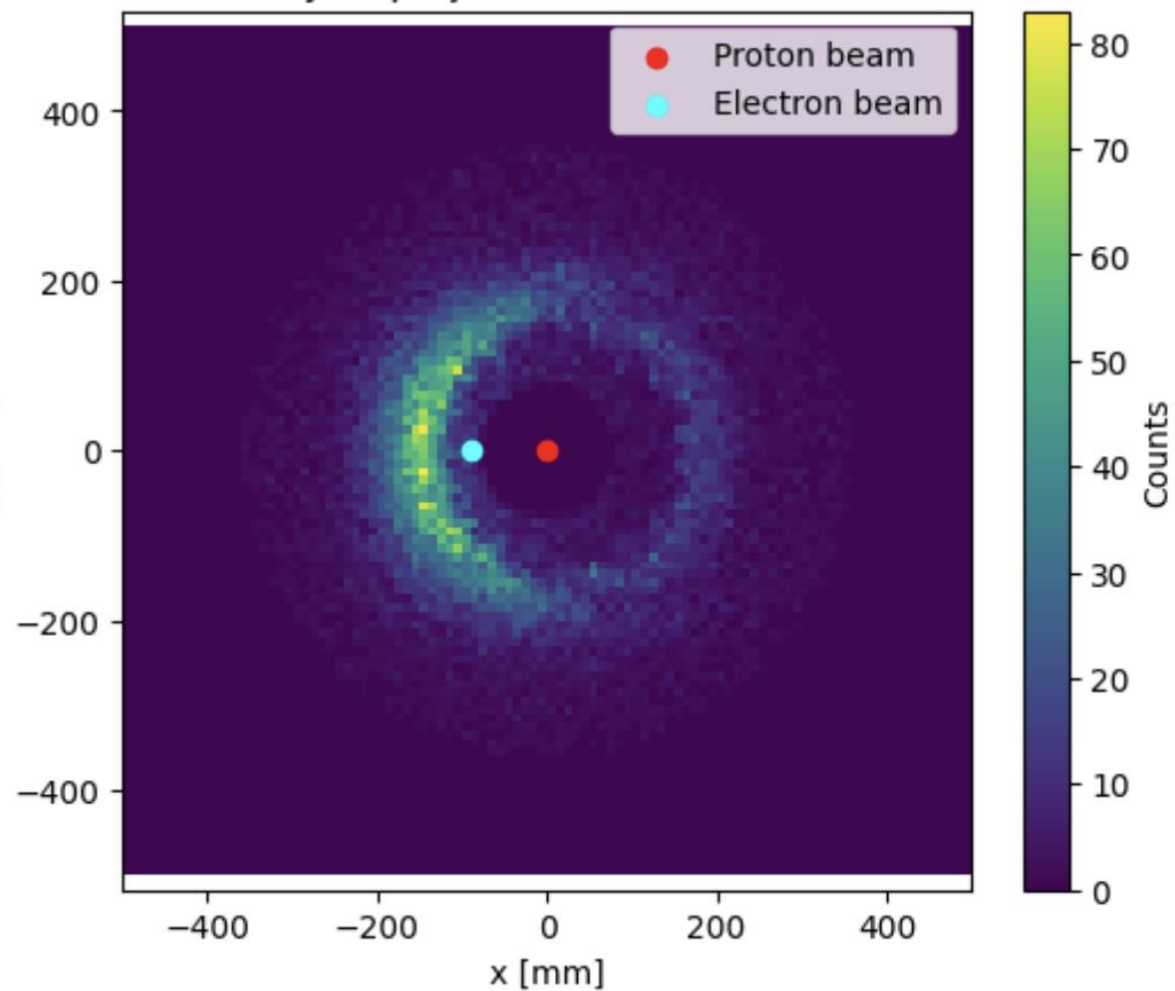$$dR = \sqrt{d\varphi^2 + d\eta^2}$$
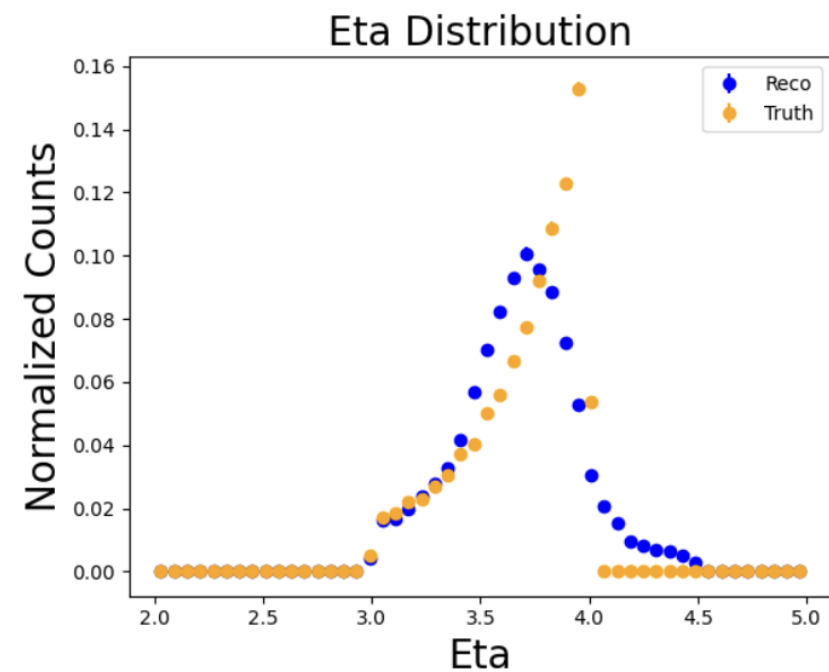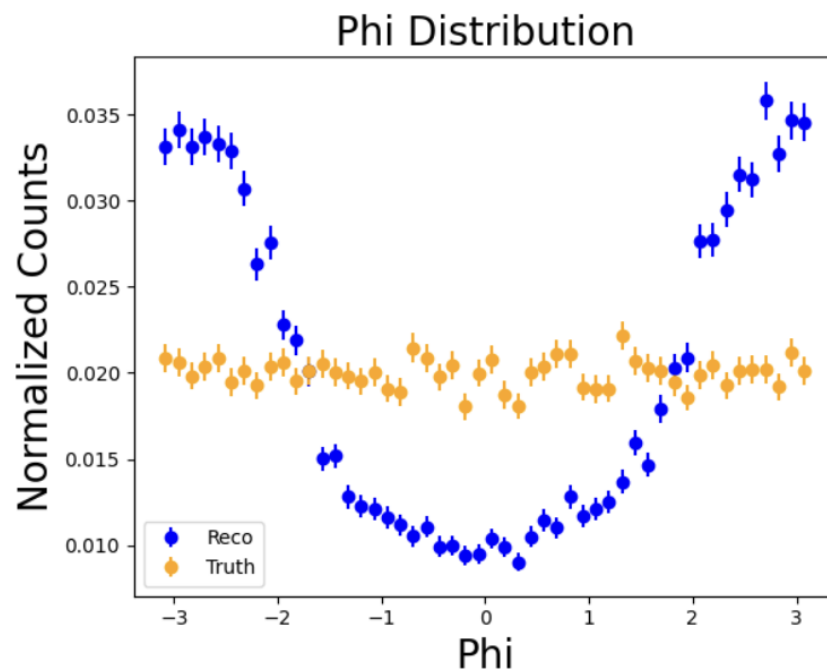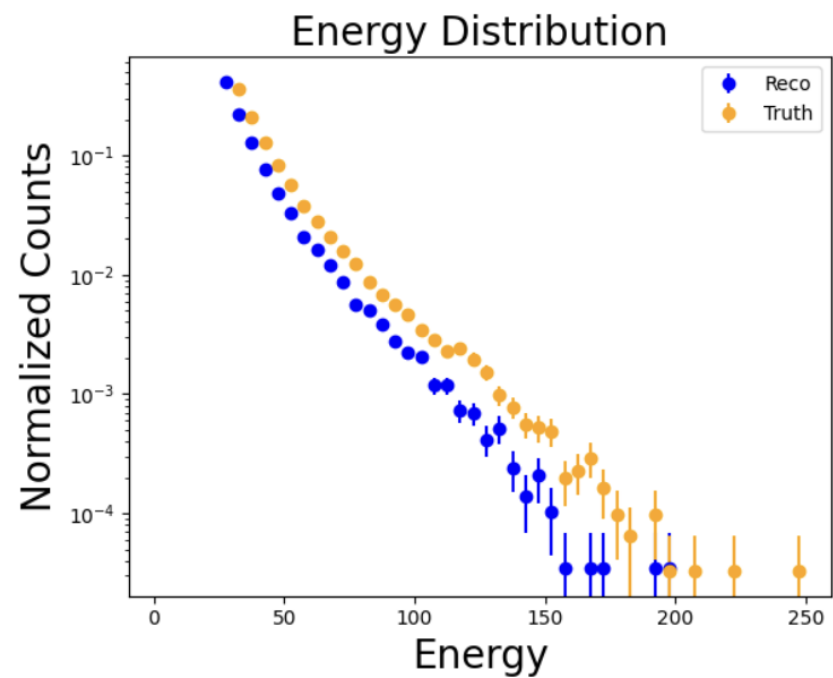
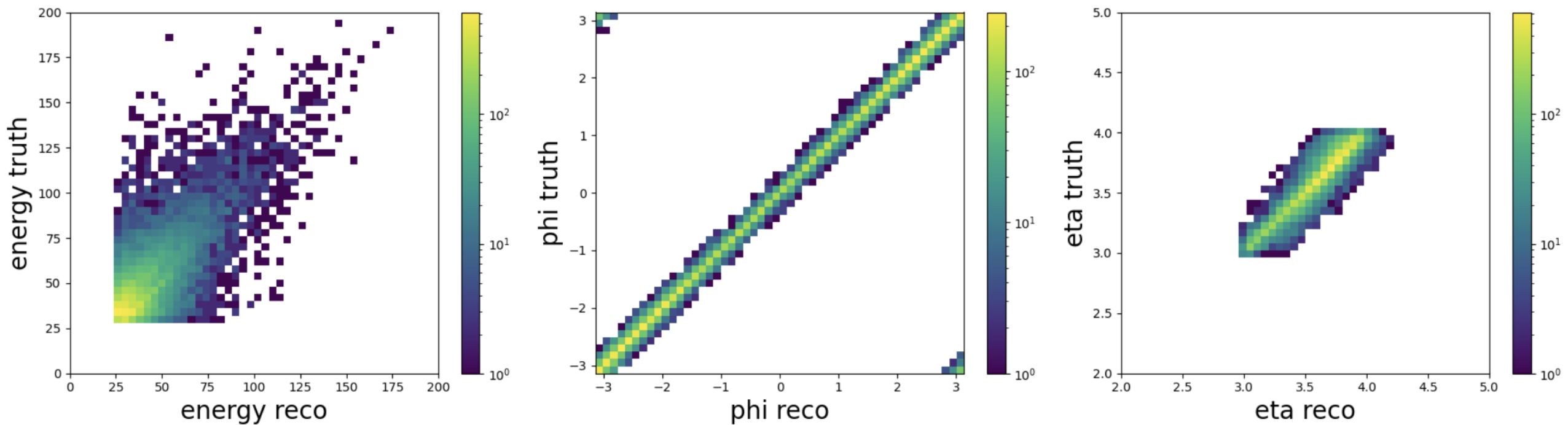- Jet energy distribution matches well, differences in phi and eta can be explained
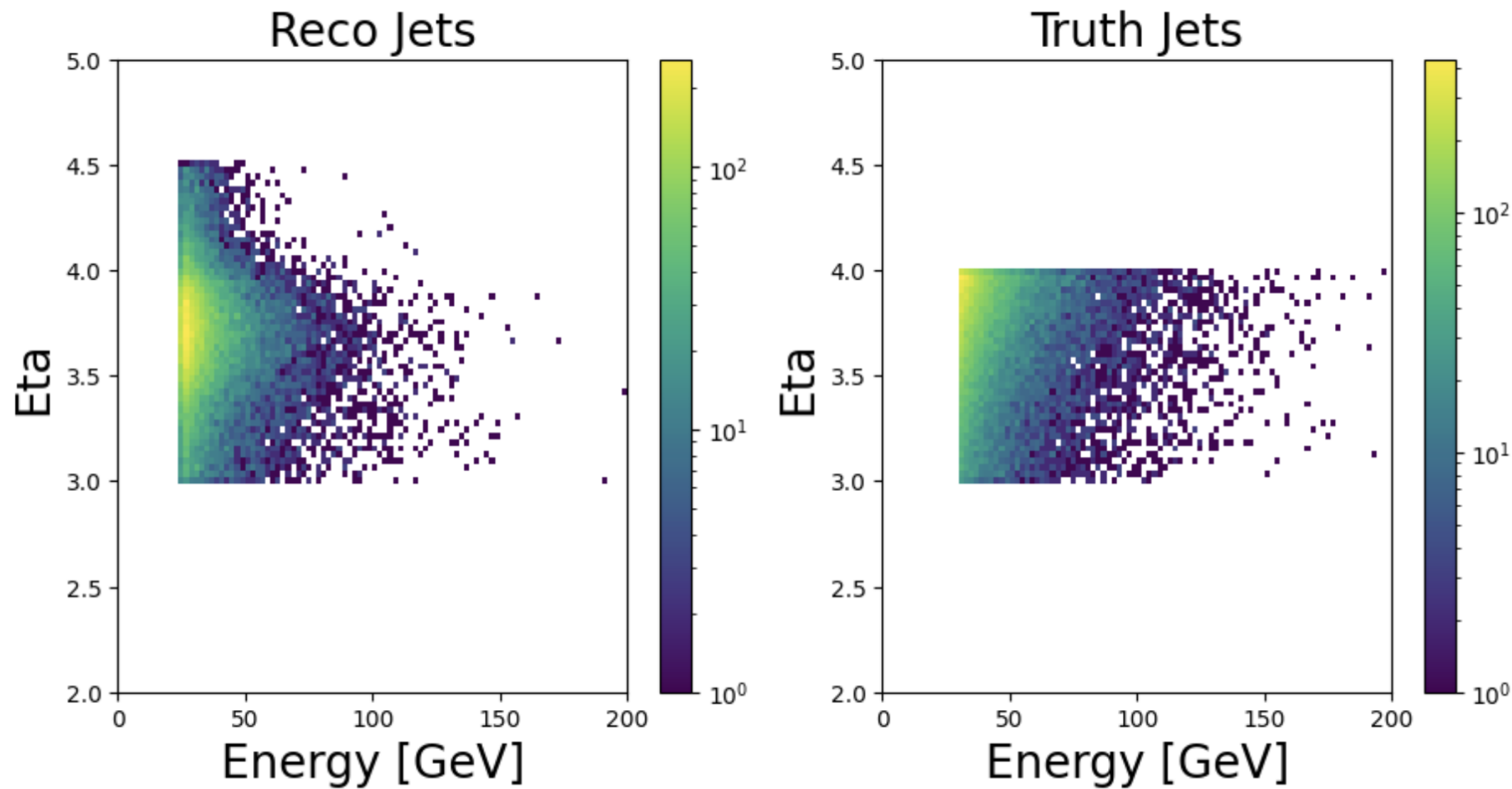
Asymmetric distribution in reconstructed jets is due to asymmetric acceptance in the insert

Good reconstruction of jet phi and eta, beginning to see a linear jet energy response

Eta-energy jet distributions in the insert region on the truth and reco level