HEP_ML
Efficiency cross check

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USTC组会报告

Data sample

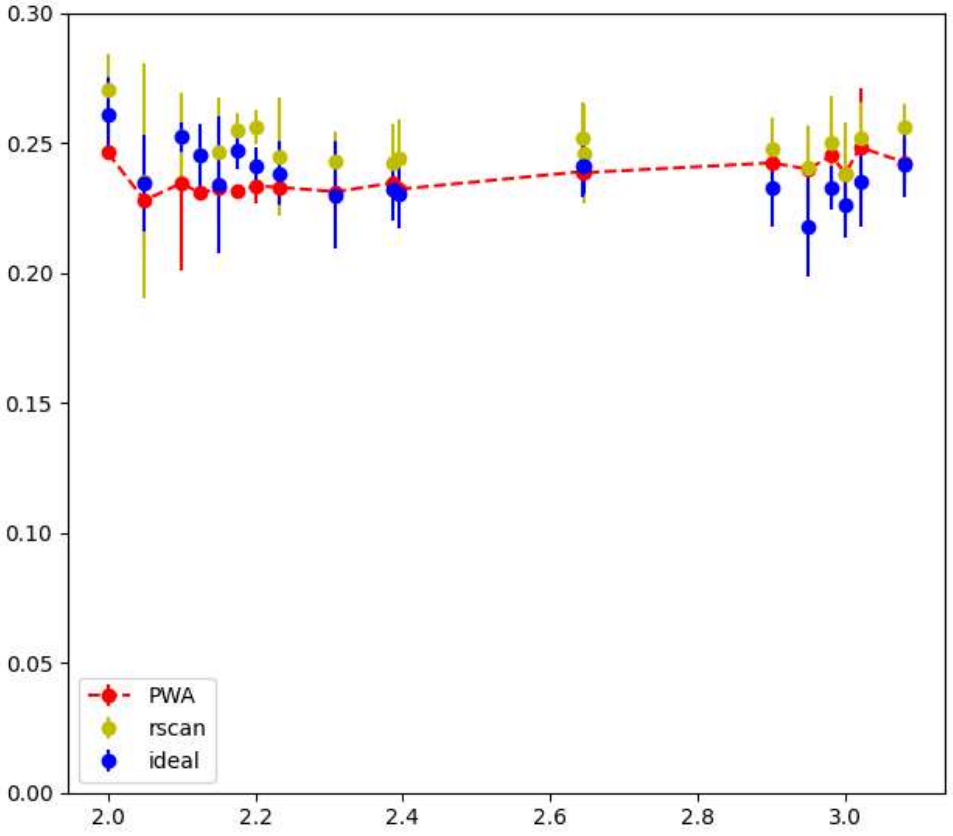
- Process: $e^+e^- \to \pi^+\pi^-\pi^0$
- 19 energy point
- 1. PWA Data (R-scan)
  - Same statistic * 10 with R-scan data
- 2. PWA Data (Ideal)
  - 20000 * 10 selected events for each energy
- 3. PHSP MC
  - 1,000,000 (truth level) for each energy
  - ~ 200,000 (selected)
- 4. PWA MC
  - 1,000,000 (truth level) for each energy
  - ~ 200,000 (selected)

Training strategy

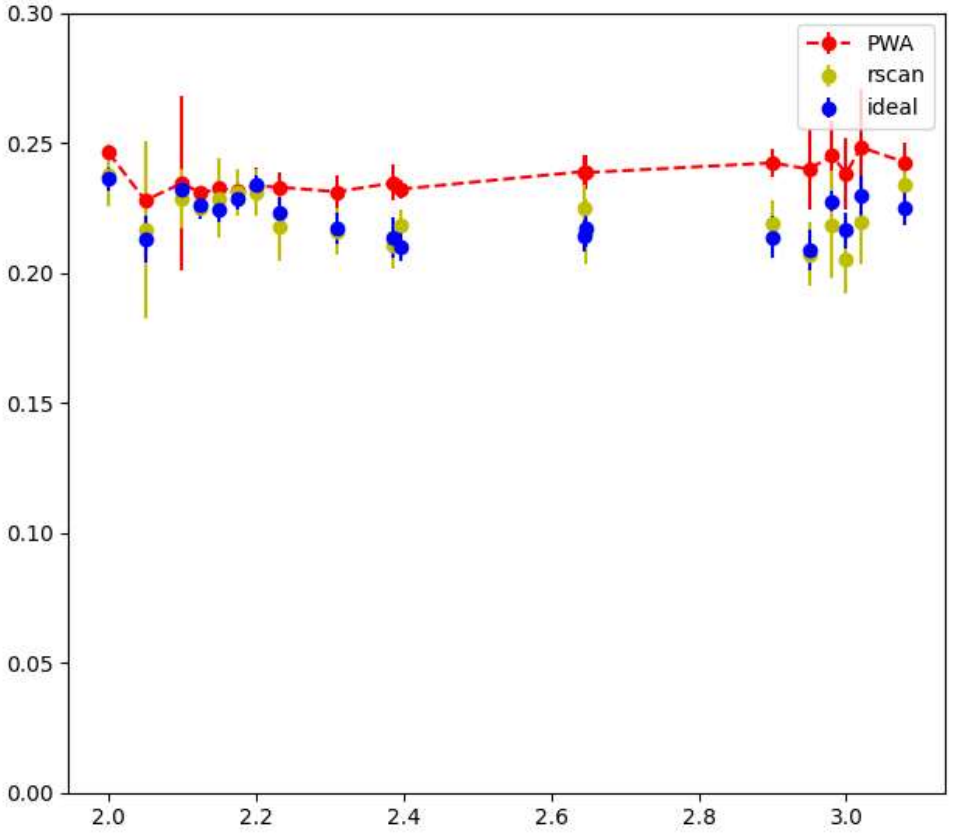
- Observable
  - 6: $m(\pi^+\pi^-,\pi^+\pi^-,\pi^+\pi^-), helicity(\pi^+,\pi^-,\pi^0)$
  - f: $m(\pi^+\pi^-,\pi^+\pi^-,\pi^+\pi^-), helicity(\pi^+,\pi^-,\pi^0), a(ee,\pi^+\pi^-\pi^0)$
- Training strategy
  - Train selected MC -> selected PWA data (Rscan)
  - Train selected MC -> selected PWA data (Ideal)
- Efficiency calculation
  - PWA efficiency: using PWA MC
    - Use io check and toymc to calculate statistic error
  - Model efficiency: using trained model weighting PHSP MC
    - Use 10 parallel sample to calculate statistic error

Efficiency

6

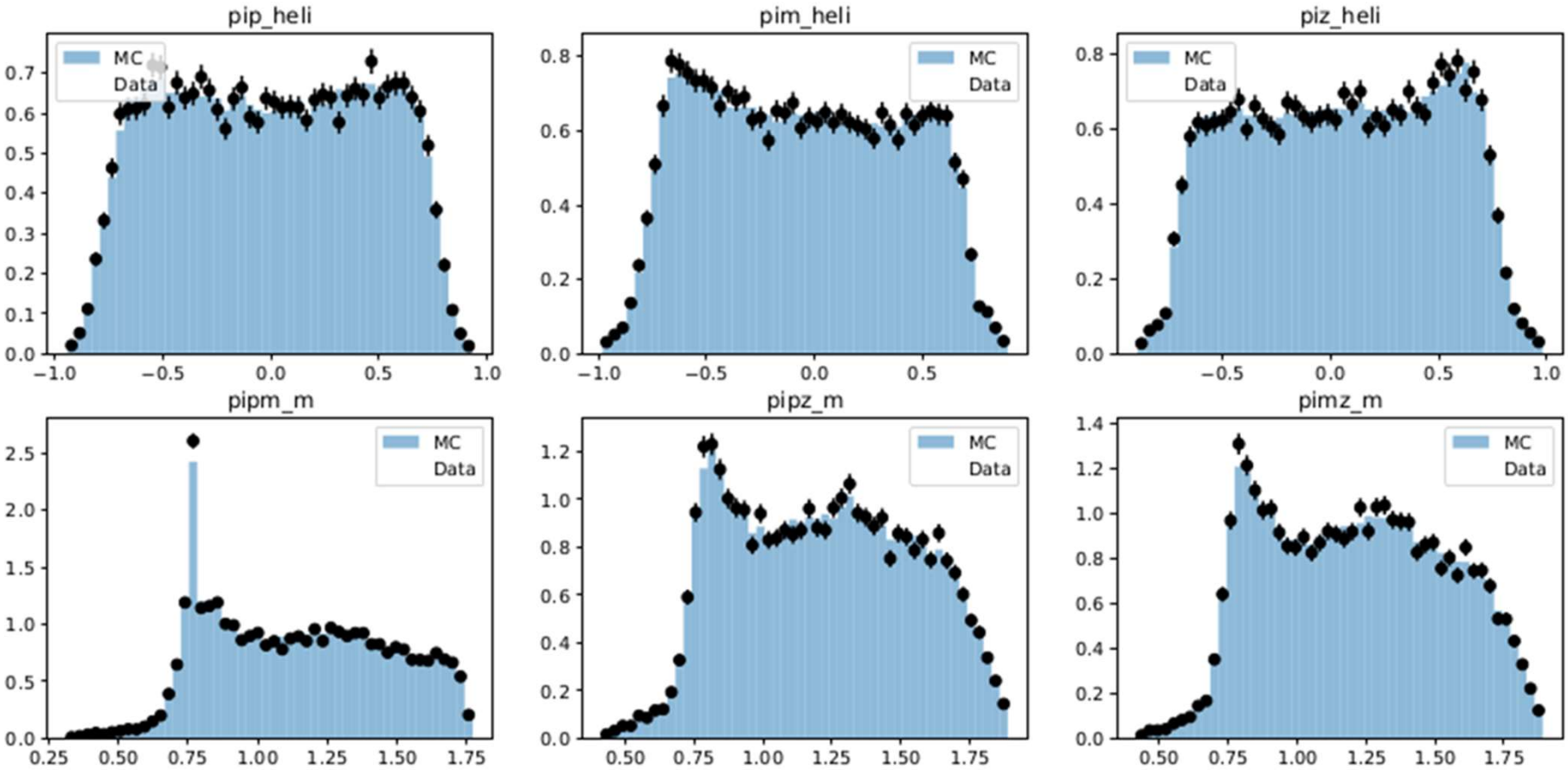


f



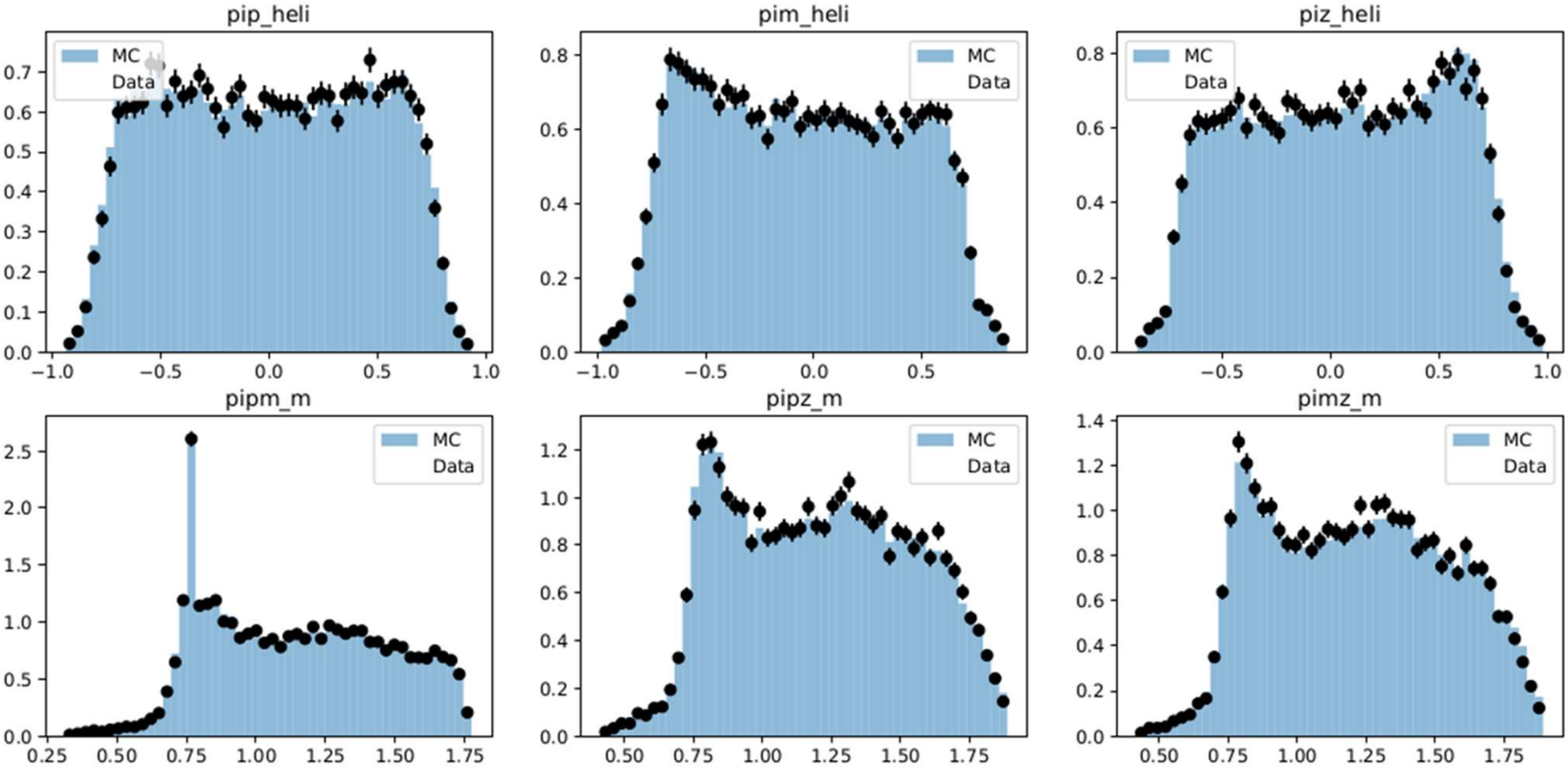
6-Ideal 2.1250 GeV

Trained PHSP



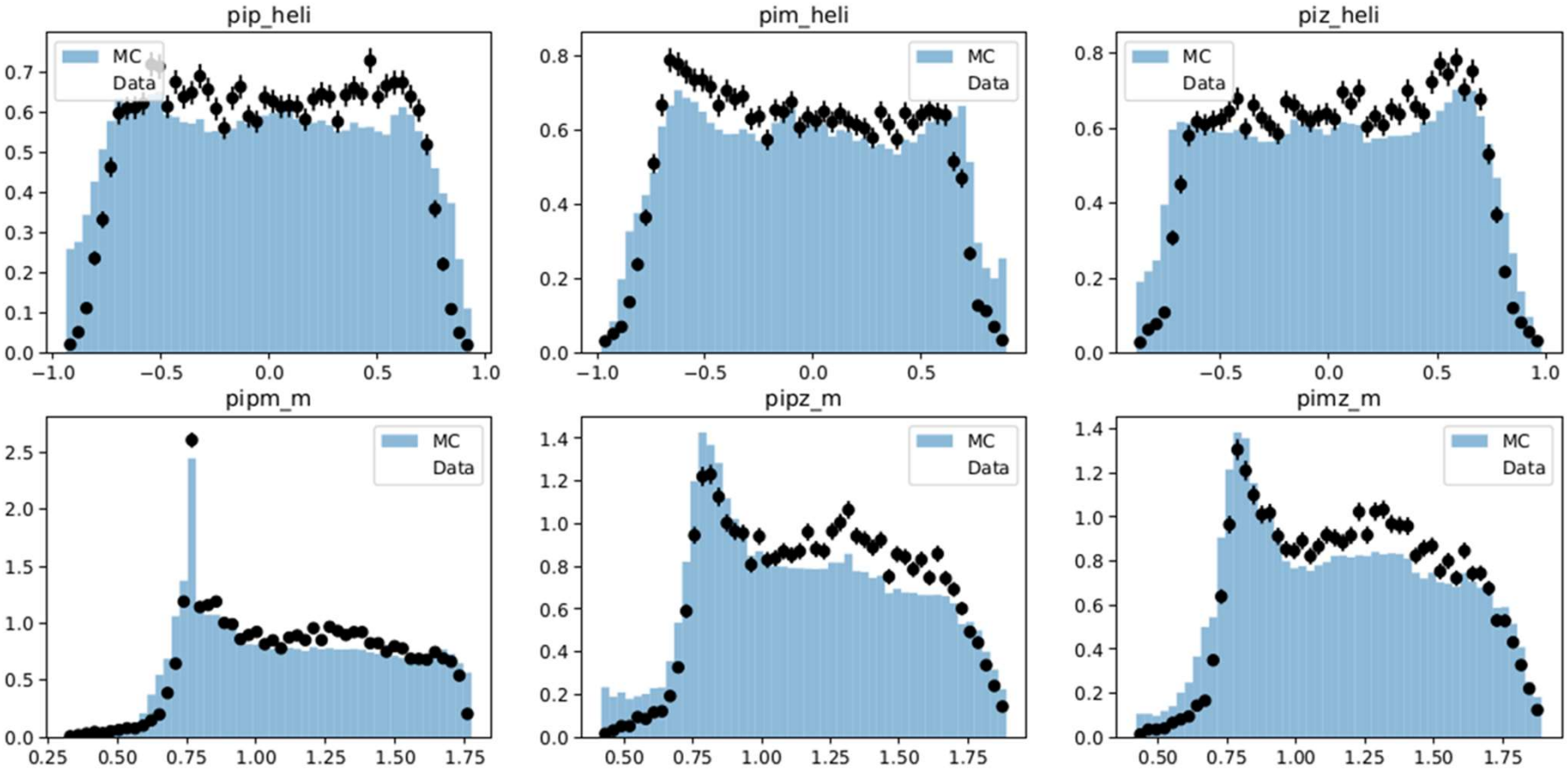
6-Ideal 2.1250 GeV

Weighted selected events



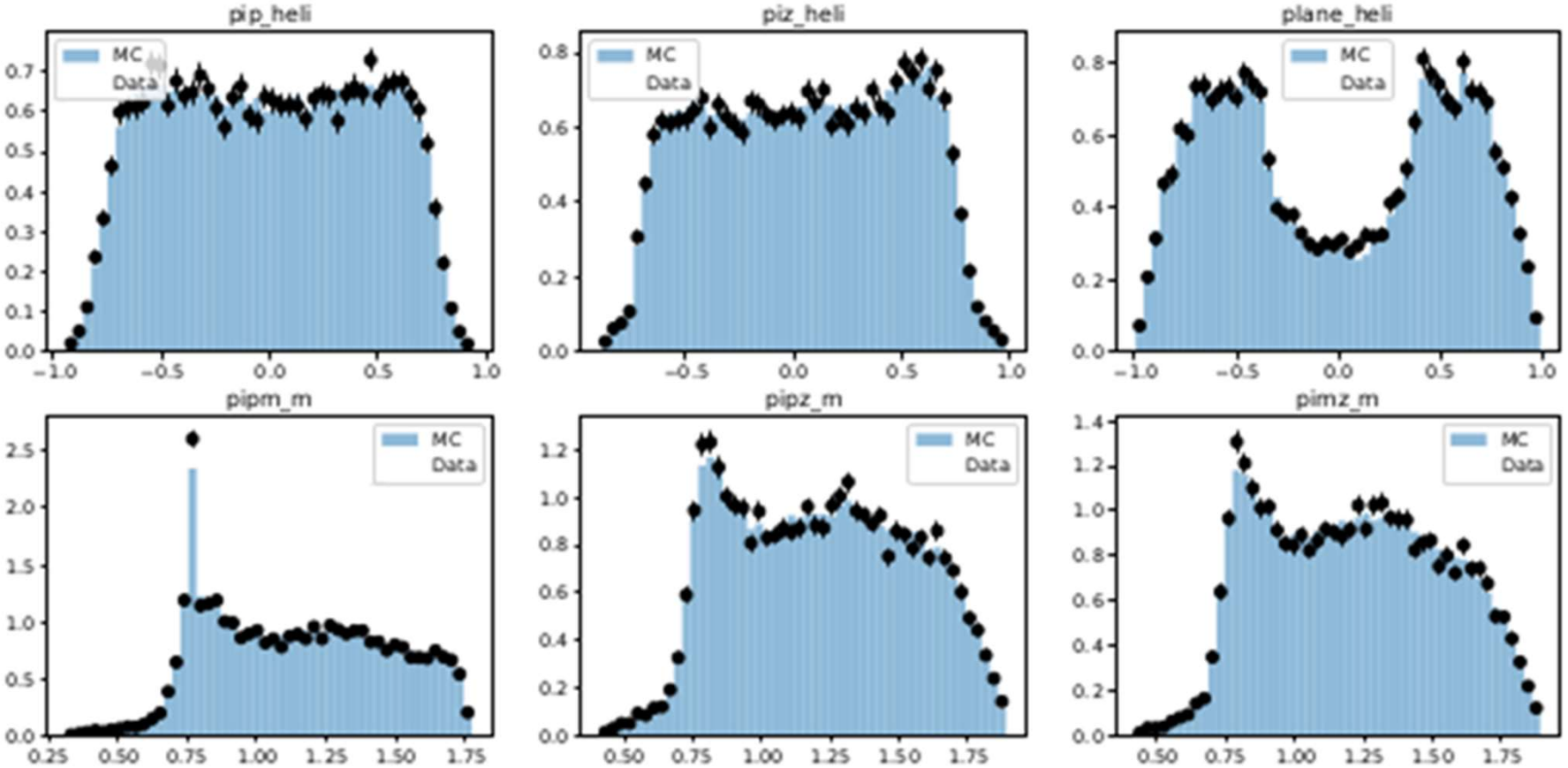
6-Ideal 2.1250 GeV

Weighted generated events



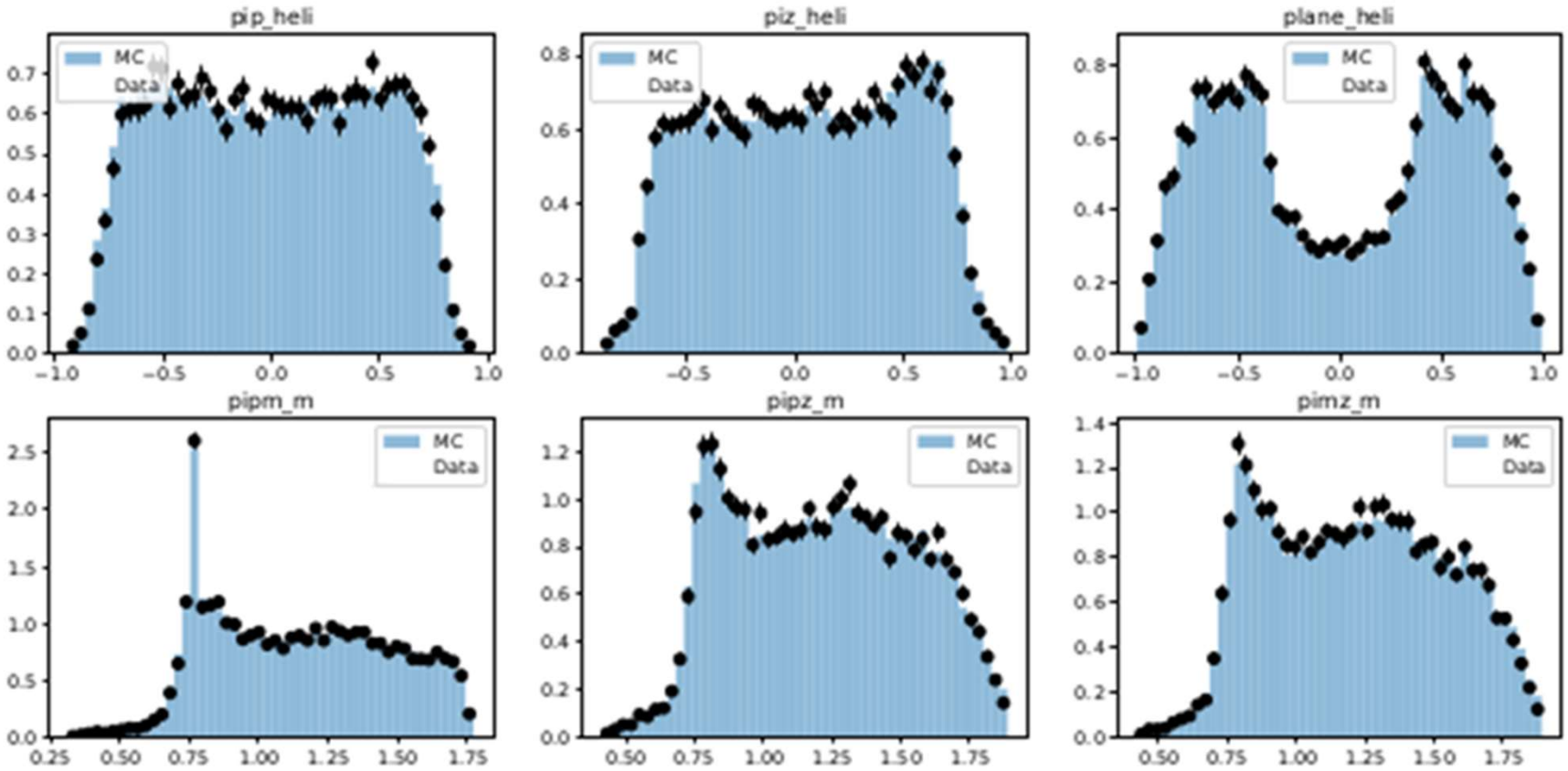
f-Ideal 2.1250 GeV

Trained PHSP



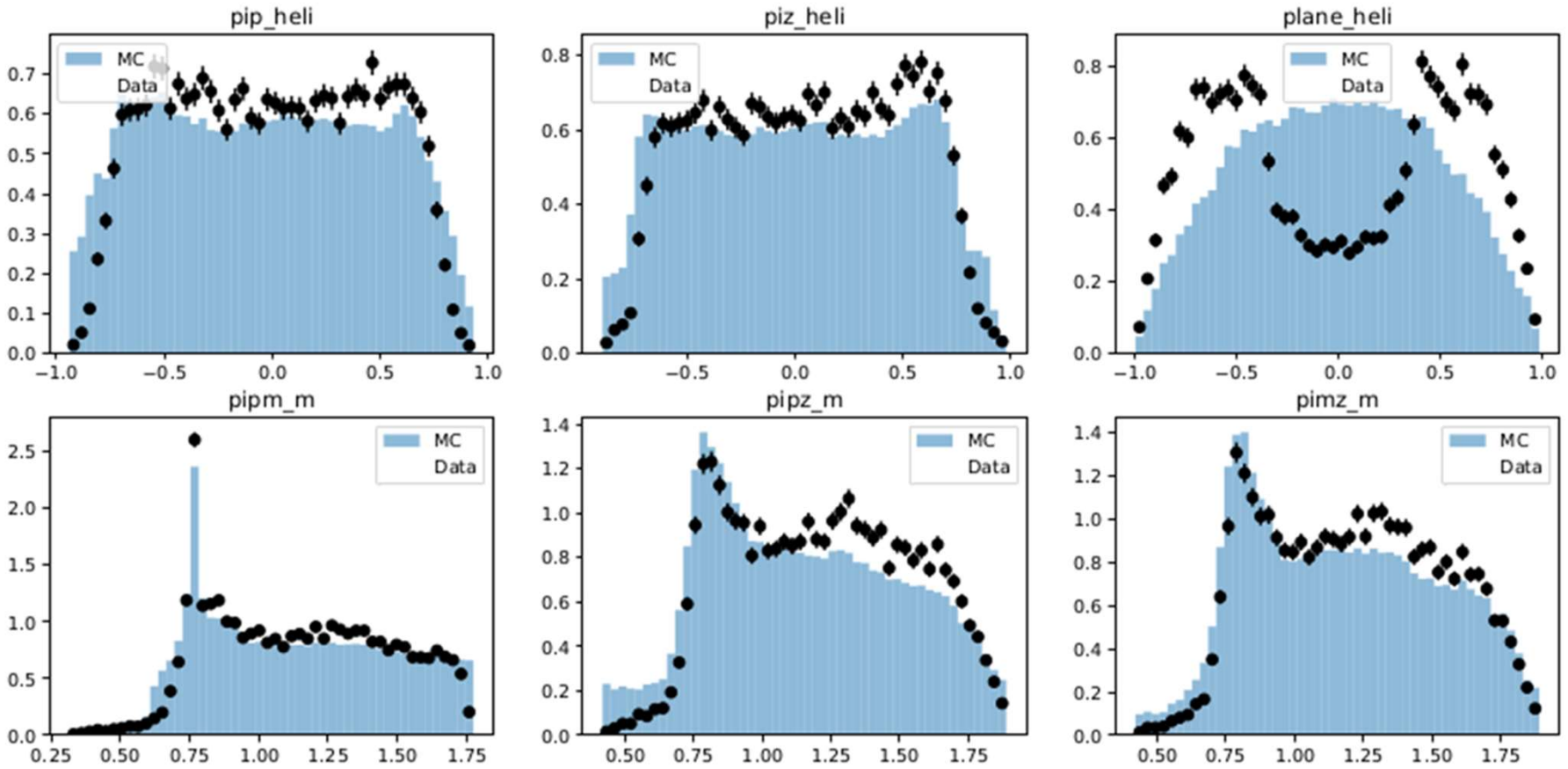
f-Ideal 2.1250 GeV

Weighted selected events



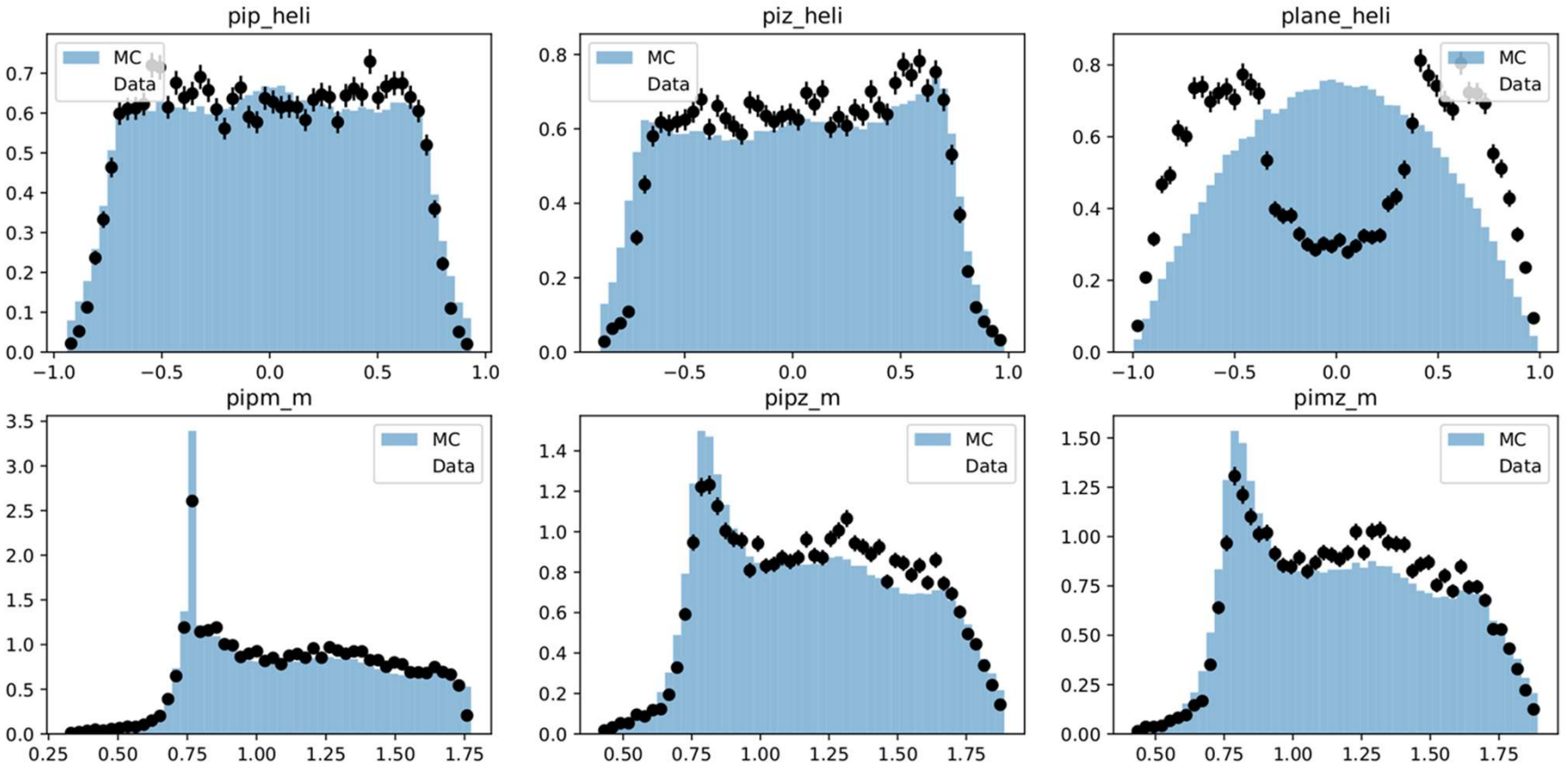
f-Ideal 2.1250 GeV

Weighted generated events (Histogram)



f-Ideal 2.1250 GeV

Real generate model (Histogram)



Summary

- Features in ML should have the same shape for selected and unselected events.