THREE_PLANE_V60_200K_ES_CC - Angular Error Analysis
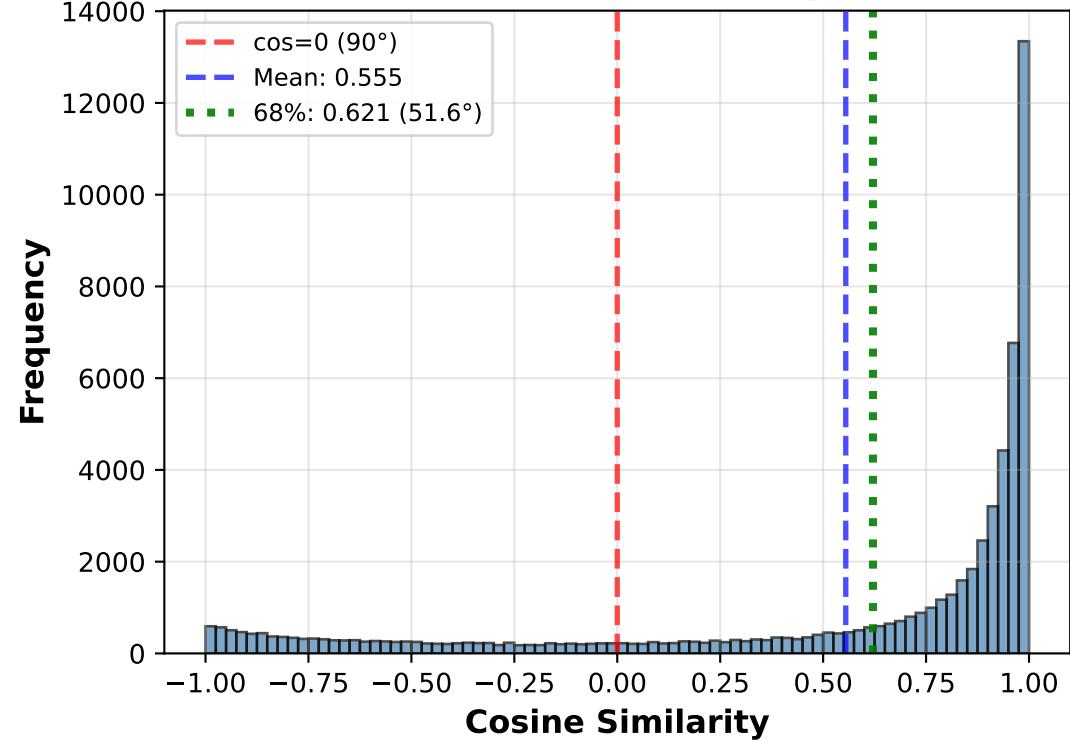
**Angular Error Distribution**
- Mean: 47.80°
- Median: 28.67°
- 68%: 51.61°

Cumulative Error Distribution
- 68%: 51.61°

Cosine Distribution (68% Quantile)
- cos=0 (90°)
- Mean: 0.555
- 68%: 0.621 (51.6°)

```
ANGULAR ERROR STATS

Samples: 60,000

Mean:   47.80°
Median: 28.67°
Std:    45.36°

25th: 14.08°
50th: 28.67°
68th: 51.61°
75th: 68.61°
90th: 127.72°
95th: 148.18°
99th: 167.01°

Min: 0.04°
Max: 179.32°
```
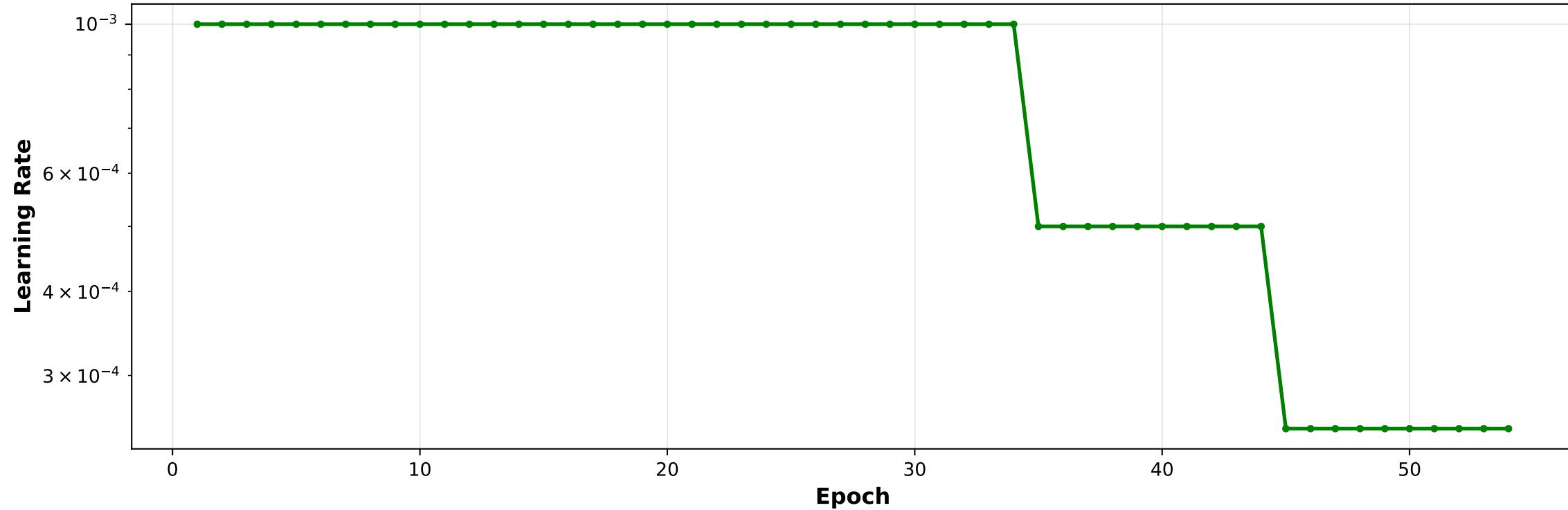
THREE_PLANE_V60_200K_ES_CC - Training History
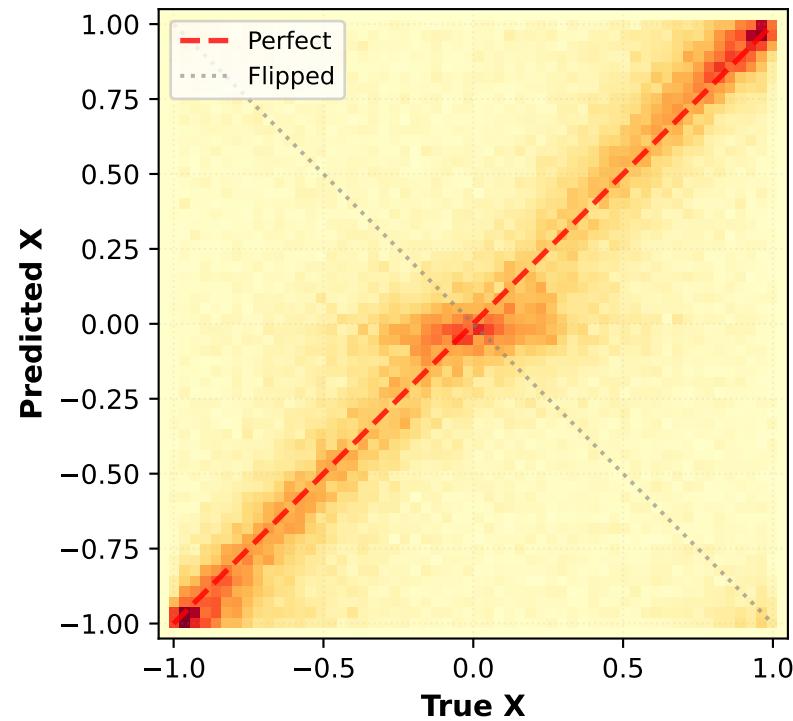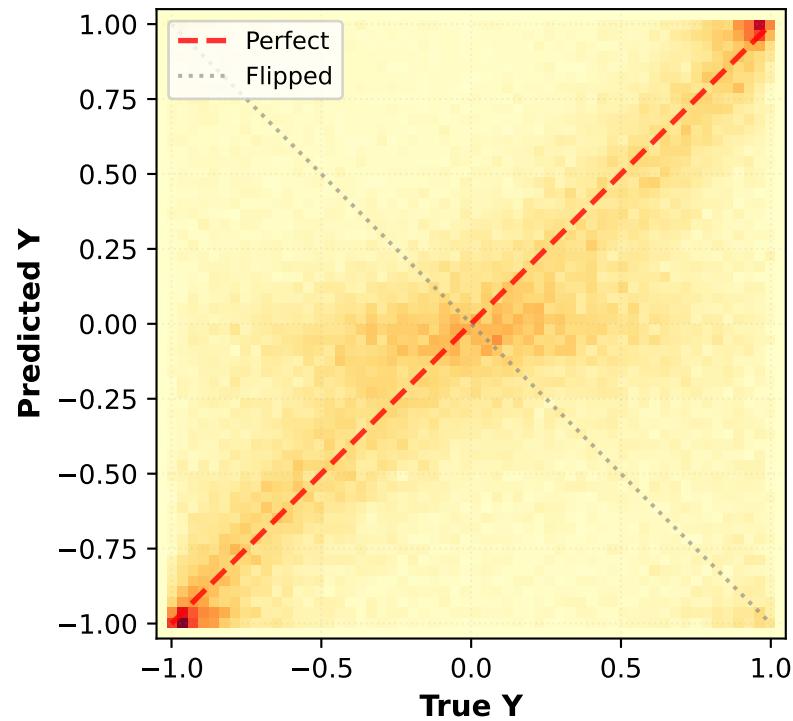
THREE_PLANE_V60_200K_ES_CC - Component Correlations
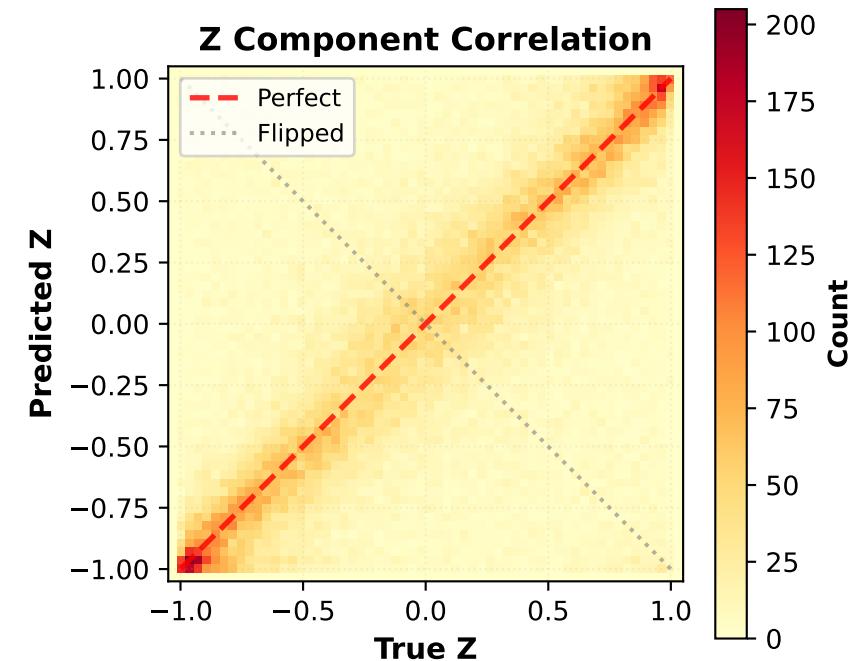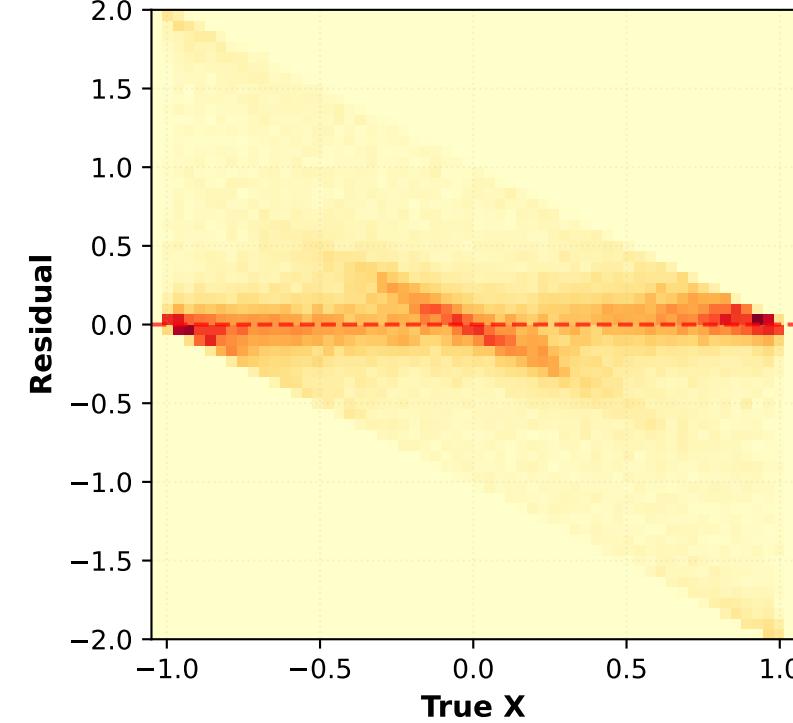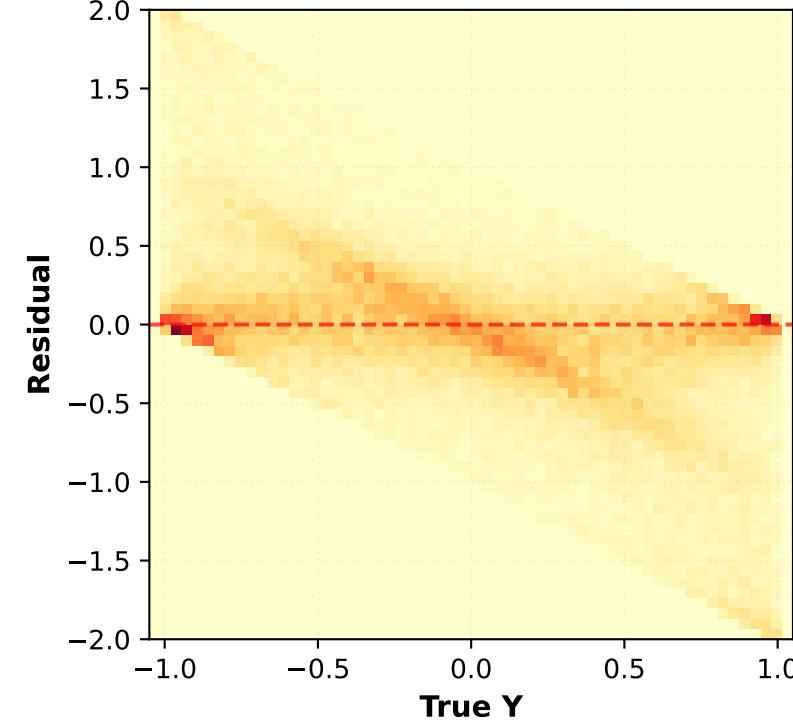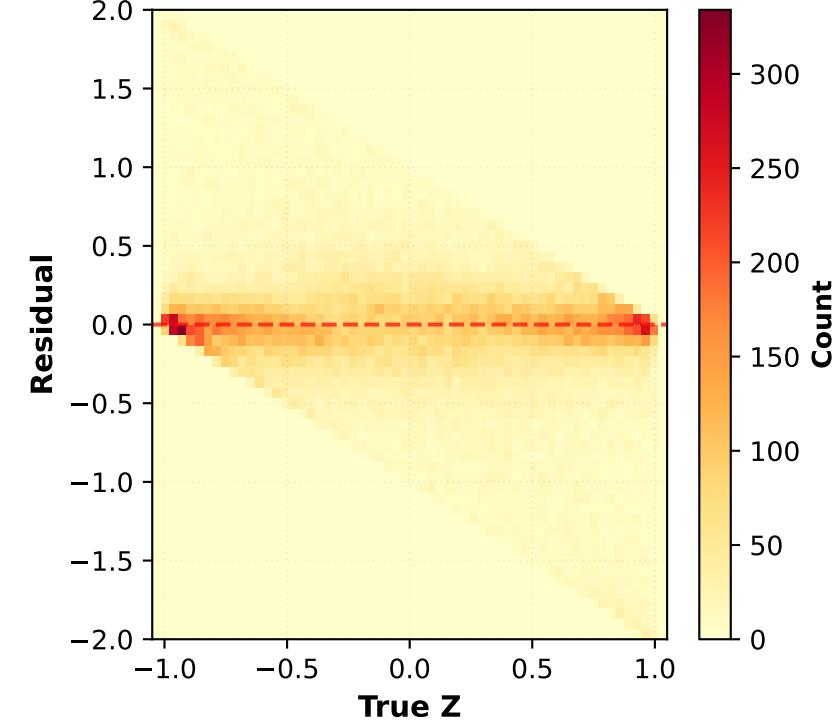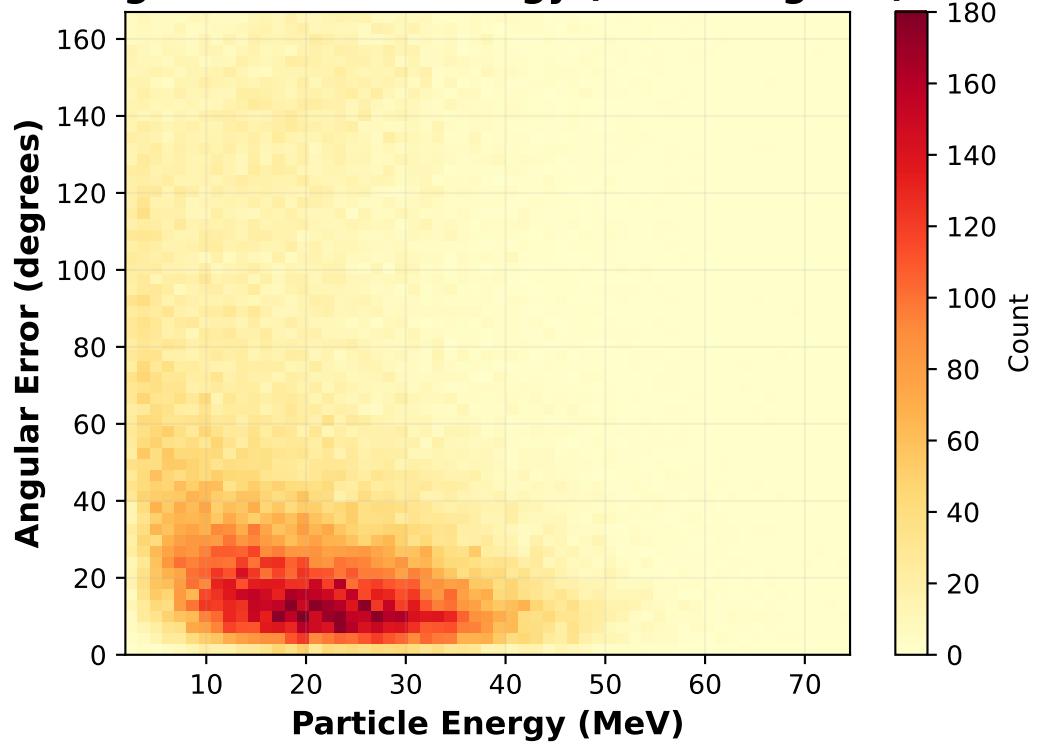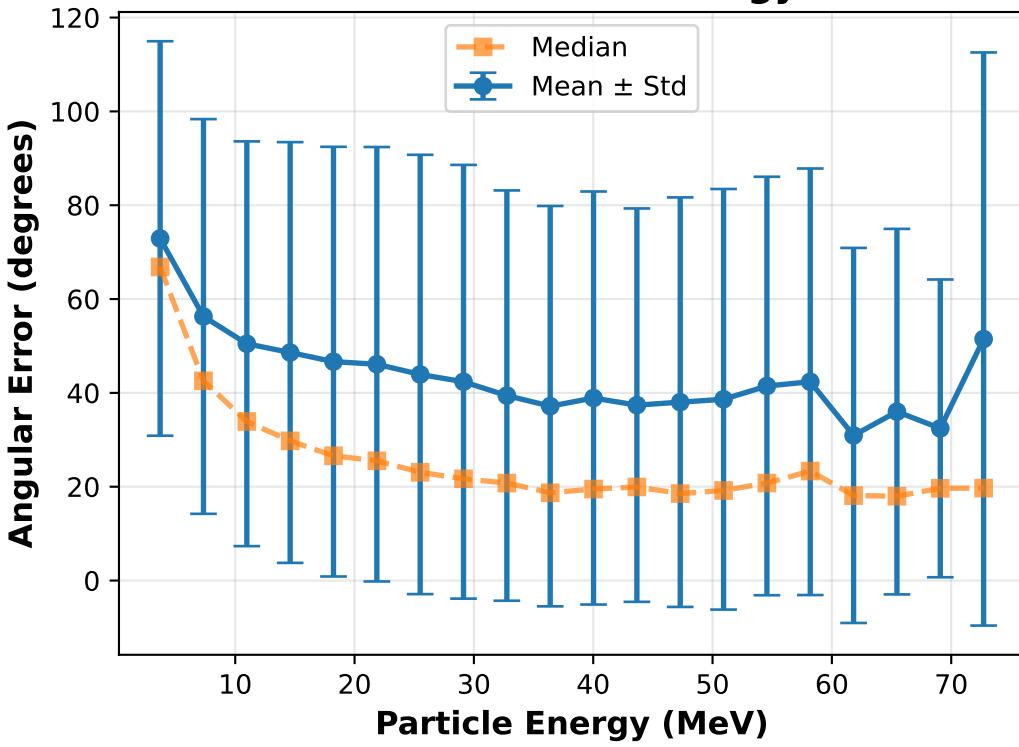
**THREE_PLANE_V60_200K_ES_CC - Energy-Dependent Performance**
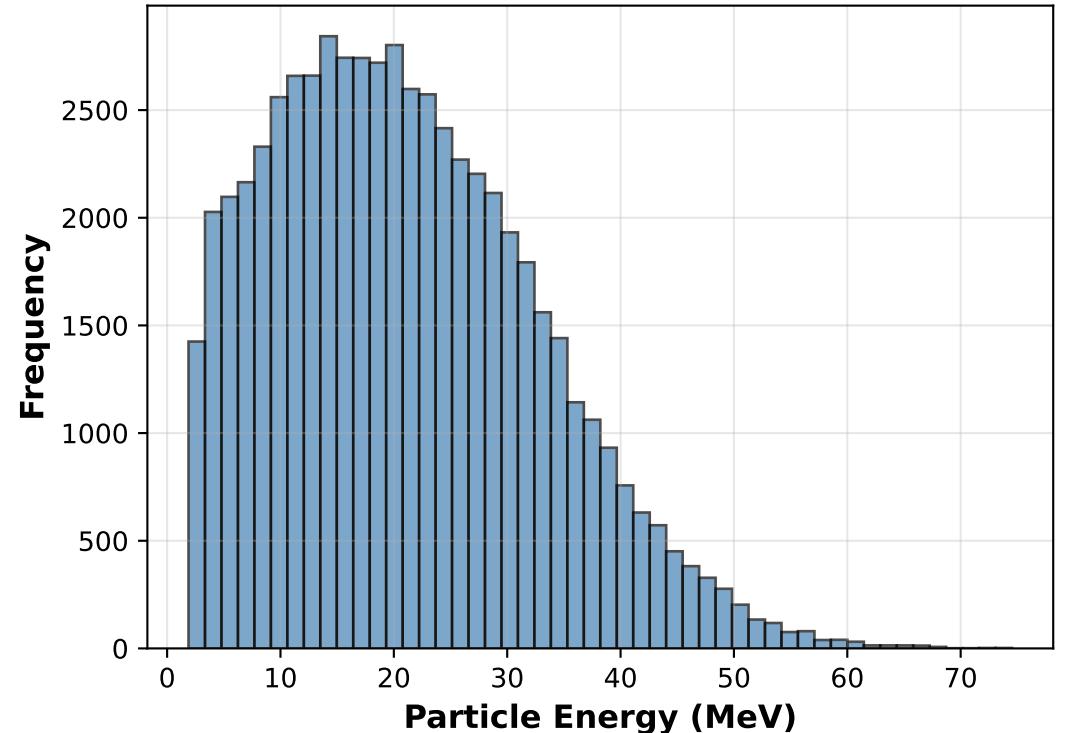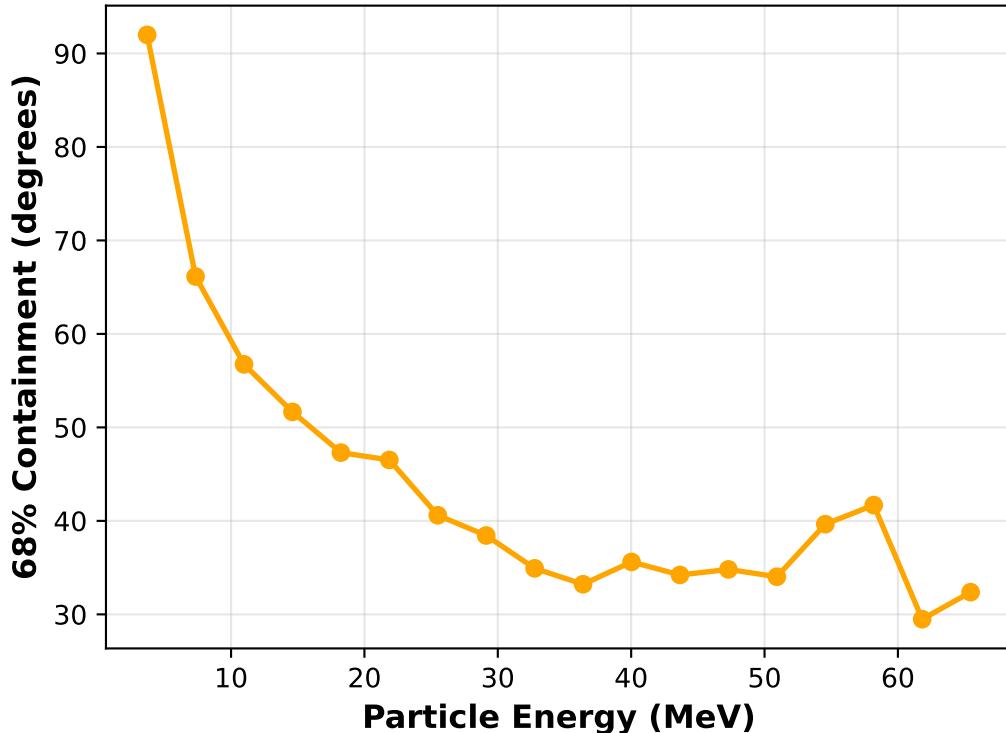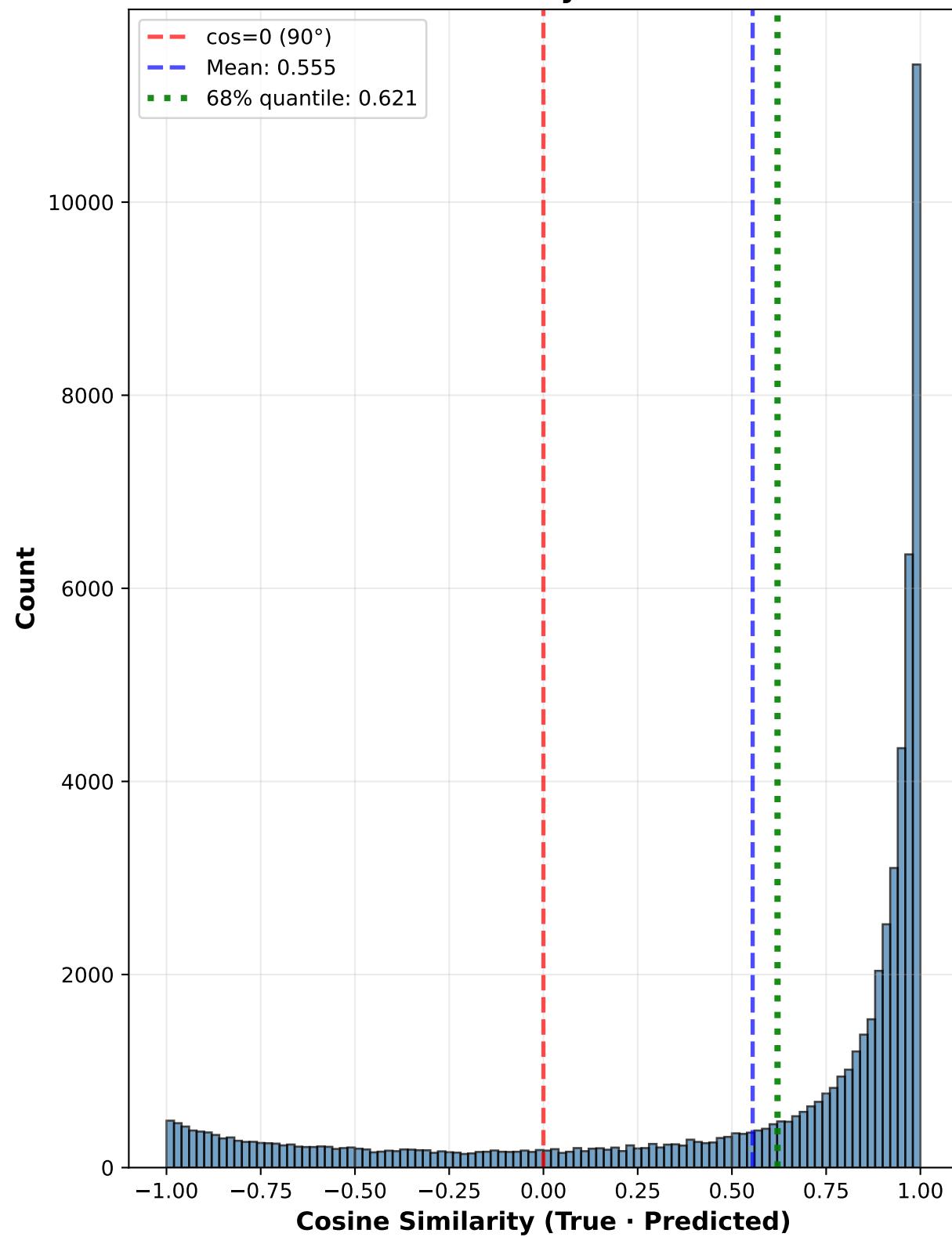
THREE_PLANE_V60_200K_ES_CC - Cosine Similarity Analysis

Cosine Similarity Distribution

- cos=0 (90°)
- Mean: 0.555
- 68% quantile: 0.621

Count

Cosine Similarity (True · Predicted)

COSINE STATS

Total: 60,000

Positive: 48,620 (81.0%)
Negative: 11,380 (19.0%)
Flipped (<-0.5): 7,159 (11.9%)
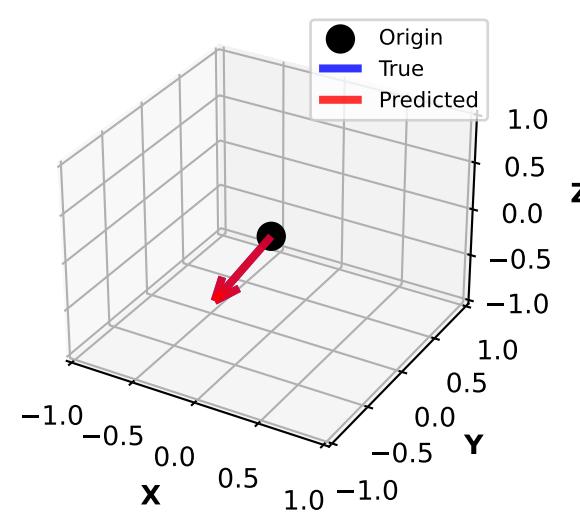
Mean: 0.555
68%: 0.621
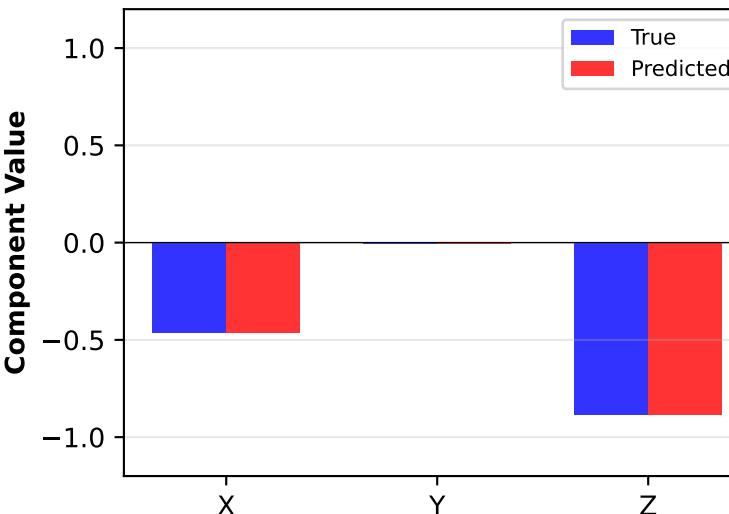
THREE_PLANE_V60_200K_ES_CC - Best and Worst Predictions

Best Prediction
Error: 0.04°

Component Comparison

DETAILS

Ang Err: 0.04°
Cosine: 1.0000

True Direction:
  X: -0.464
  Y: -0.005
  Z: -0.886

Predicted:
  X: -0.464
  Y: -0.006
  Z: -0.886

Residuals:
  ΔX: -0.000
  ΔY: -0.001
  ΔZ: +0.000
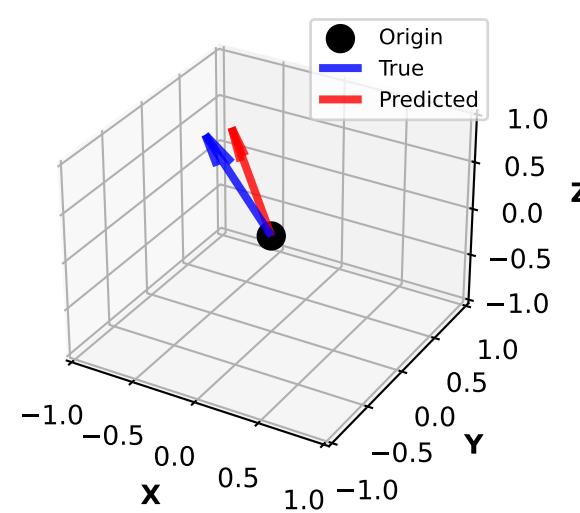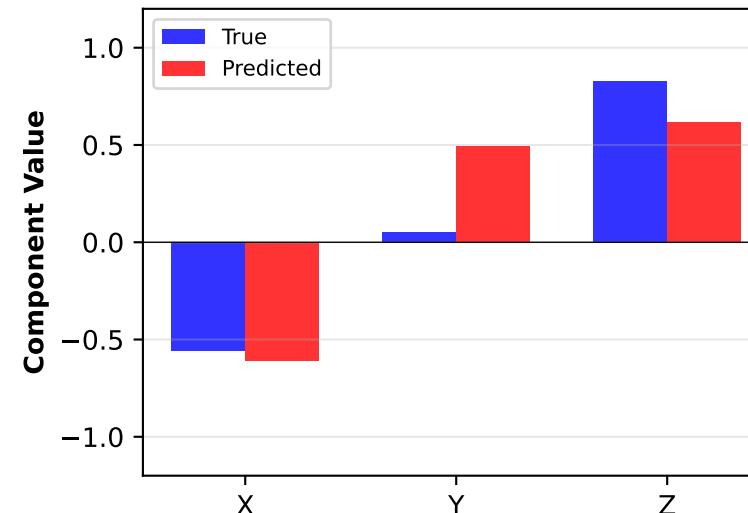
Median Prediction
Error: 28.67°

Component Comparison

DETAILS

Ang Err: 28.67°
Cosine: 0.8774

True Direction:
  X: -0.557
  Y: +0.052
  Z: +0.829

Predicted:
  X: -0.611
  Y: +0.496
  Z: +0.616

Residuals:
  ΔX: -0.054
  ΔY: +0.444
  ΔZ: -0.212
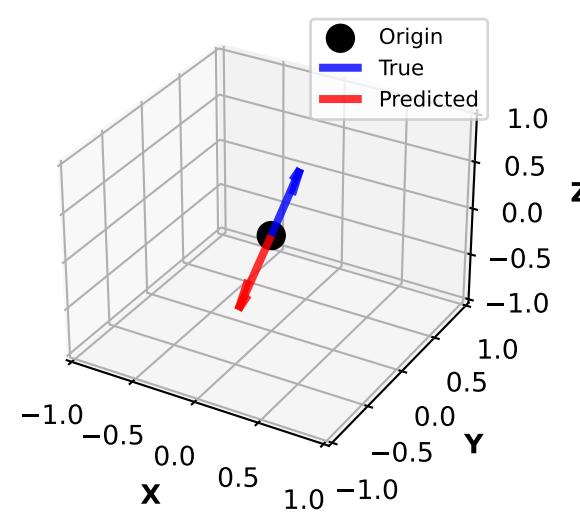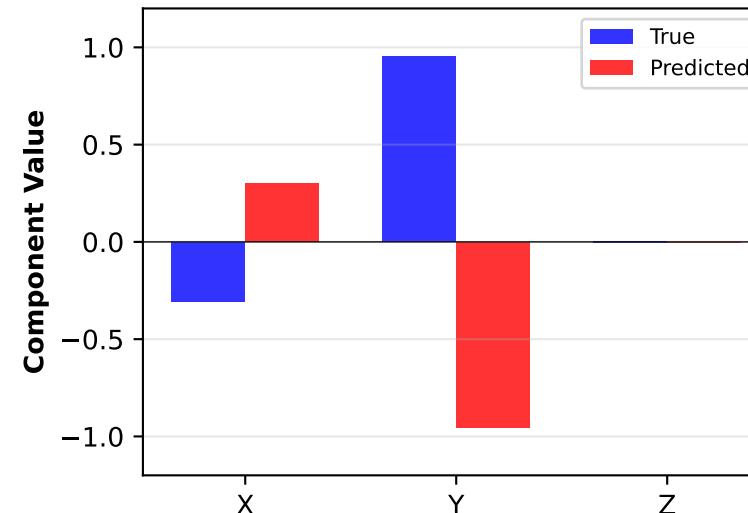
Worst Prediction
Error: 179.32°

Component Comparison

DETAILS

Ang Err: 179.32°
Cosine: -0.9999

True Direction:
  X: -0.306
  Y: +0.952
 Z: -0.006

Predicted:
  X: +0.299
  Y: -0.954
  Z: -0.003

Residuals:
  ΔX: +0.605
  ΔY: -1.906
  ΔZ: +0.003
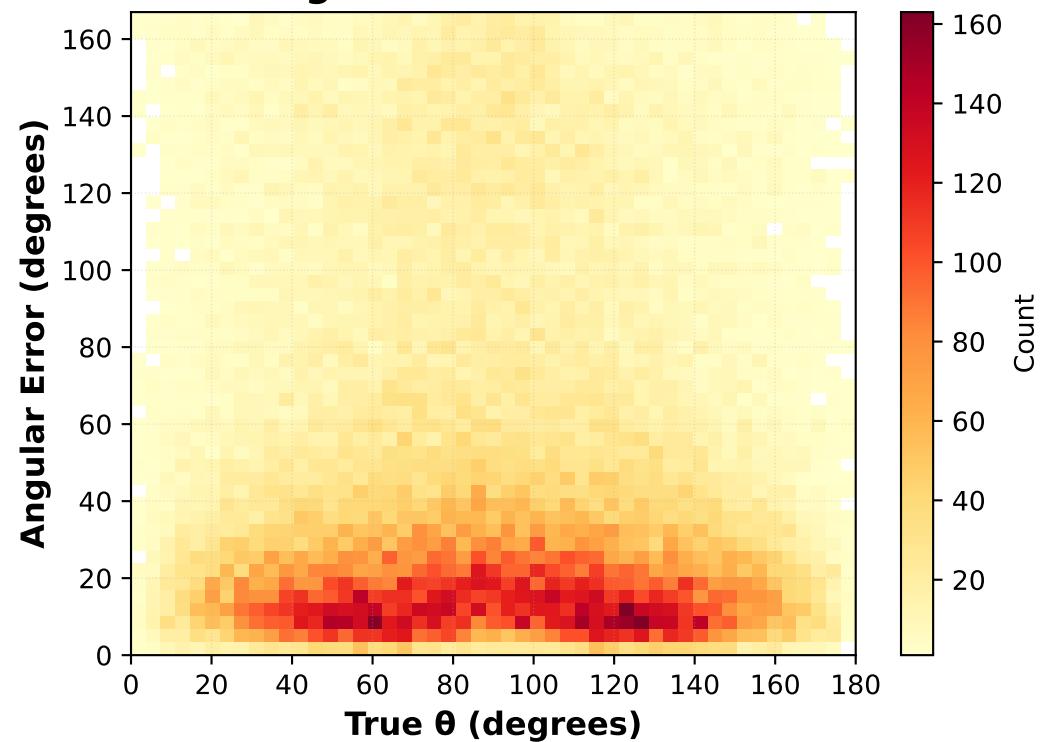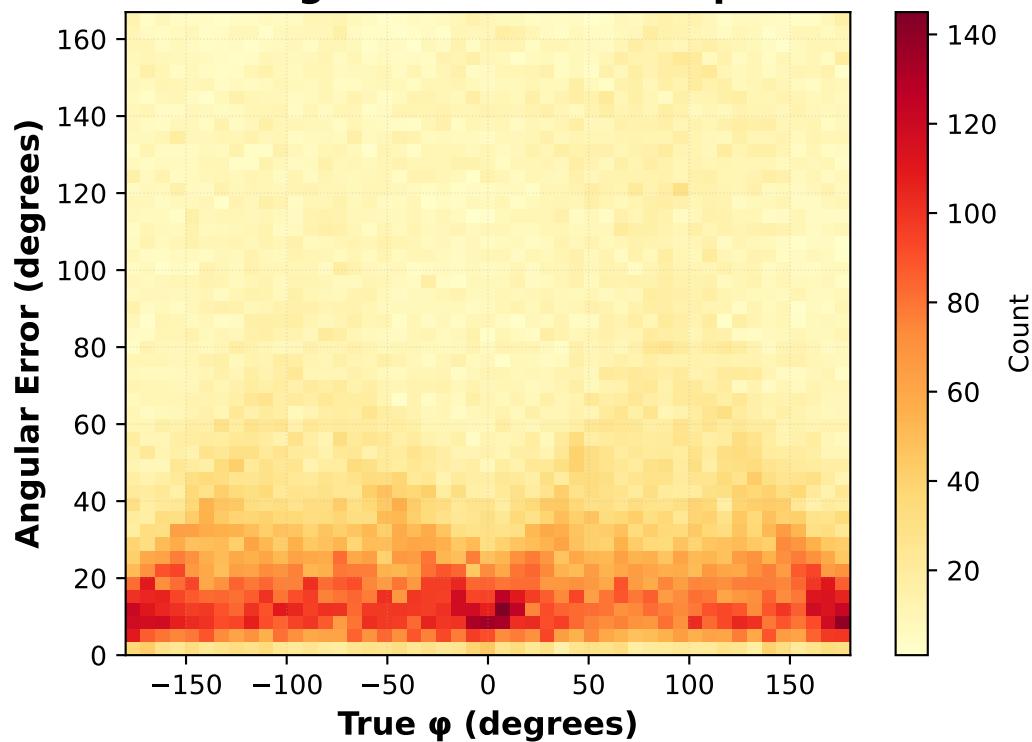
THREE_PLANE_V60_200K_ES_CC - Error Dependence on True Angles