Performance evaluation new geometry

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DEEP UNDERGROUND NEUTRINO EXPERIMENT

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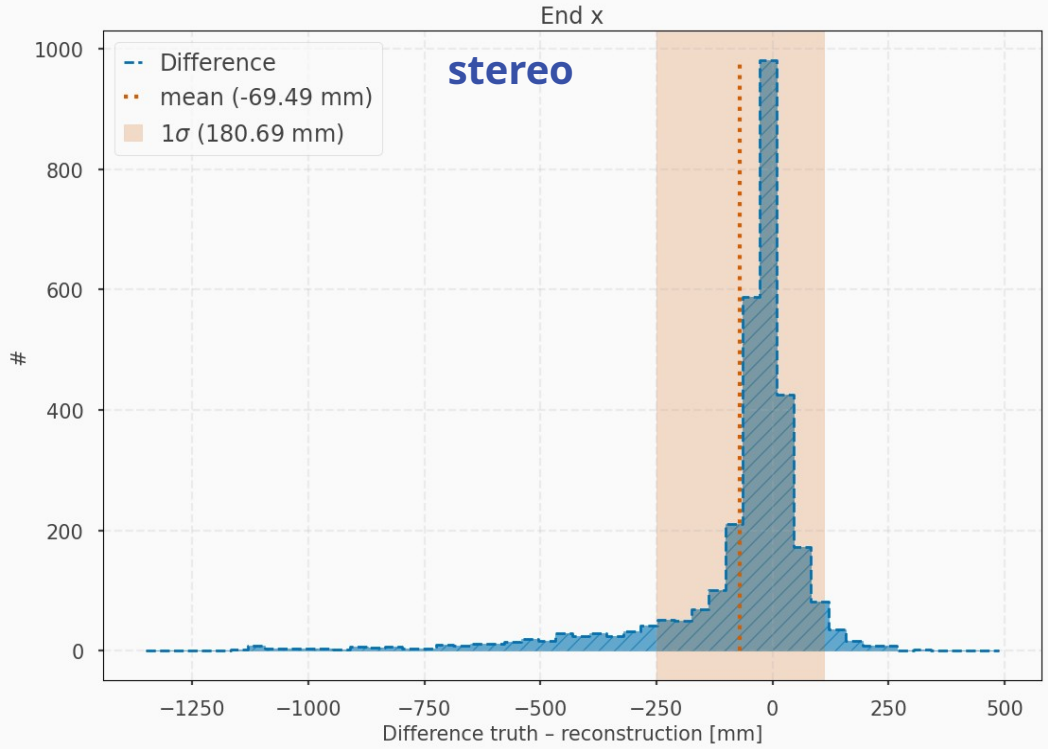
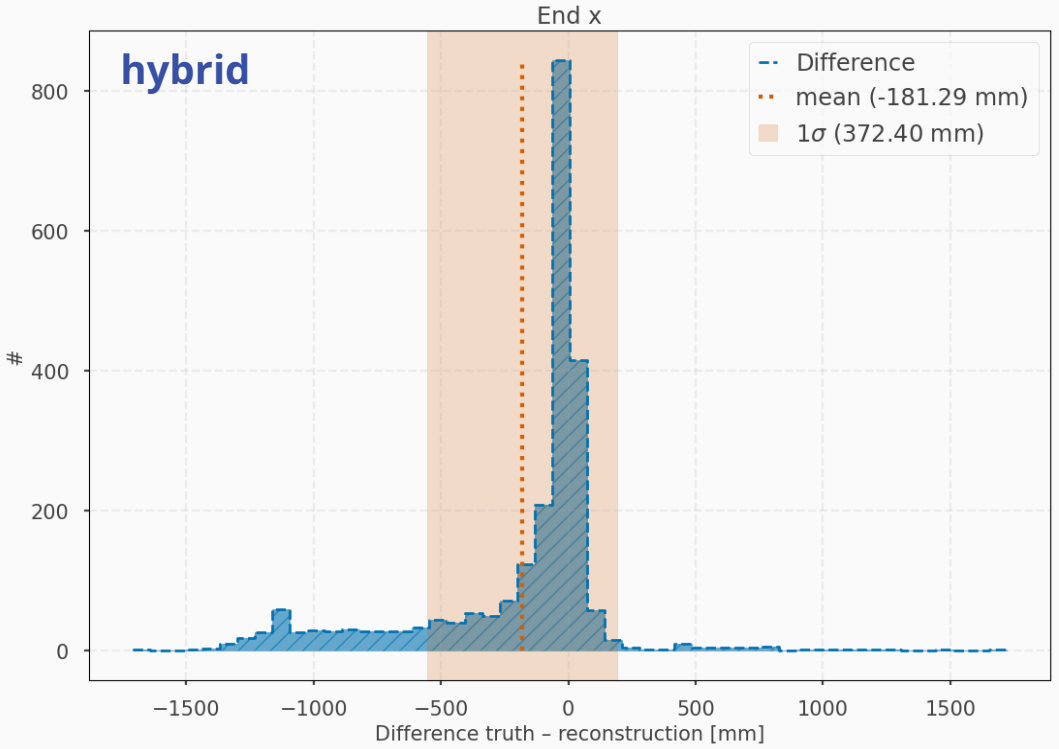
Introduction

- New geometry implemented and functioning reconstruction
  - Without Kalman filter for now to enable proper comparison
- Evaluate physics performance of Magnus' muon gun files as practice for 'tiny' production
- → optimization_evaluation.py script
  - End point resolution
  - Charge ID
    - Direct and per KE slices
  - Angular resolution
    - Direct and per KE slices

End point resolution – truth - reconstruction

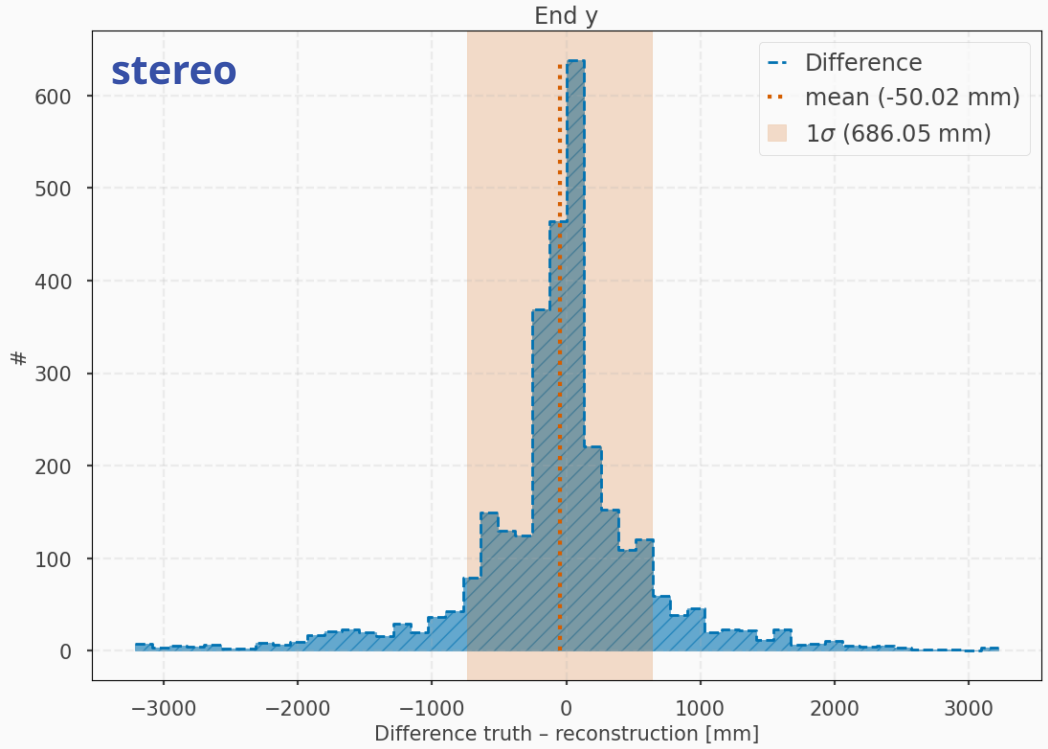
- In **x** direction

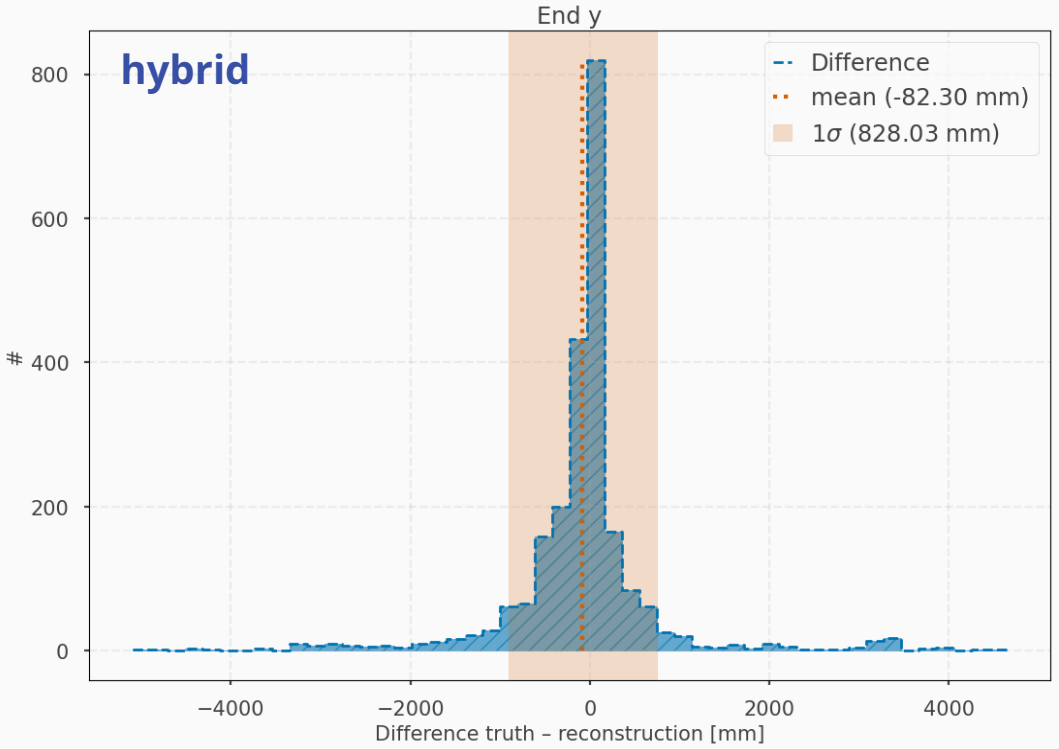




End point resolution – truth - reconstruction

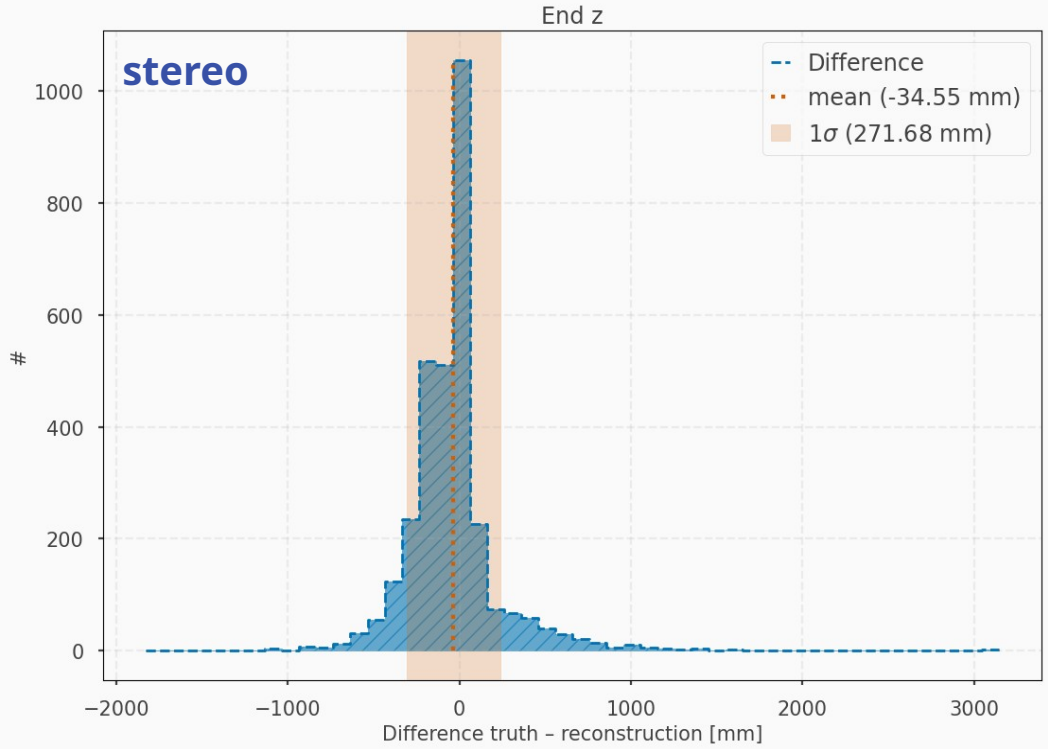
- In **y** direction

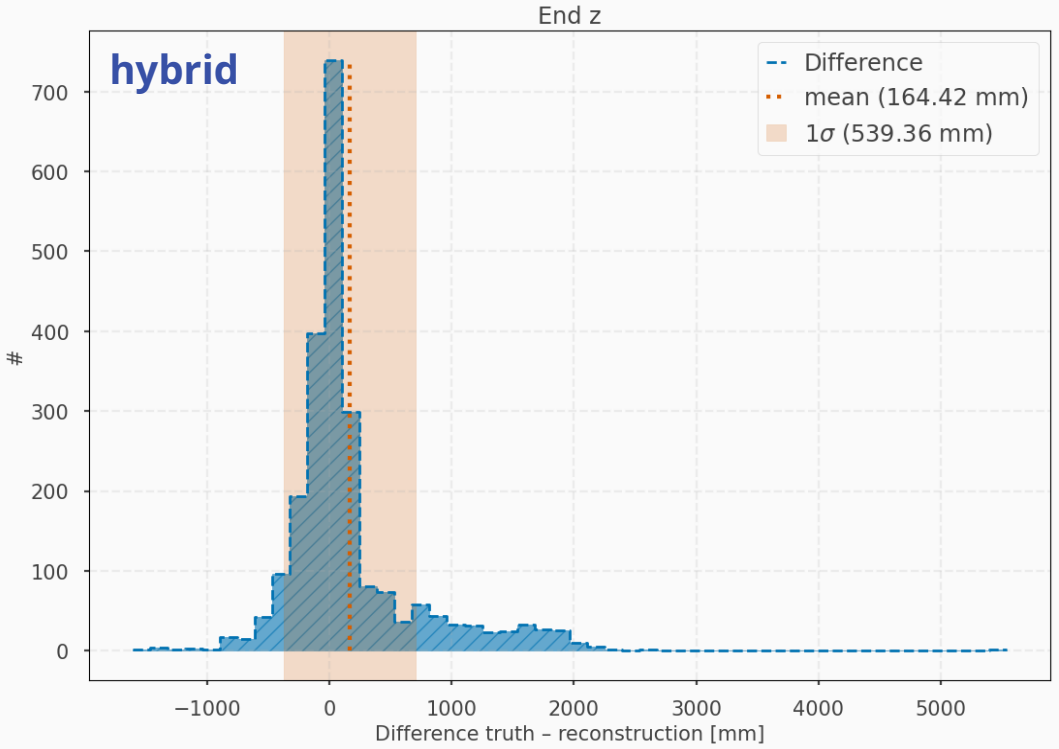




End point resolution – truth - reconstruction

- In **z** direction





Charge ID

Stereo

- Not identified: 58
- True μ: 1961
- True anti-μ: 0
- False μ: 0
- False anti-μ: 1165 (incl. not id'ed)
- Efficiency: 63.9%

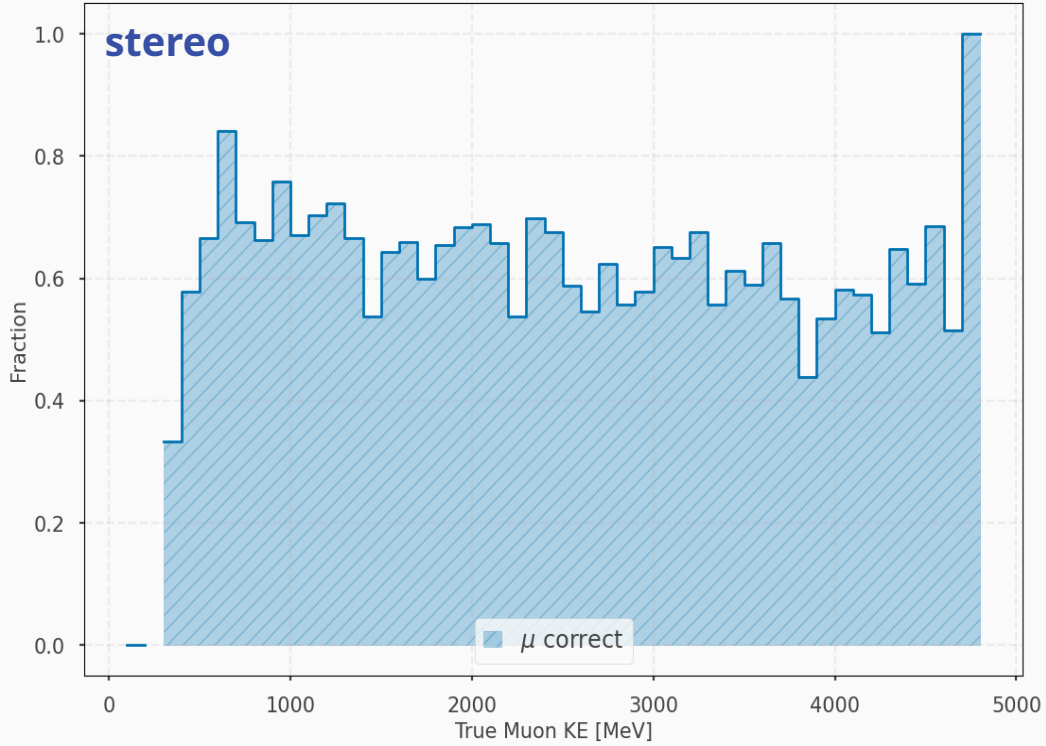
Hybrid

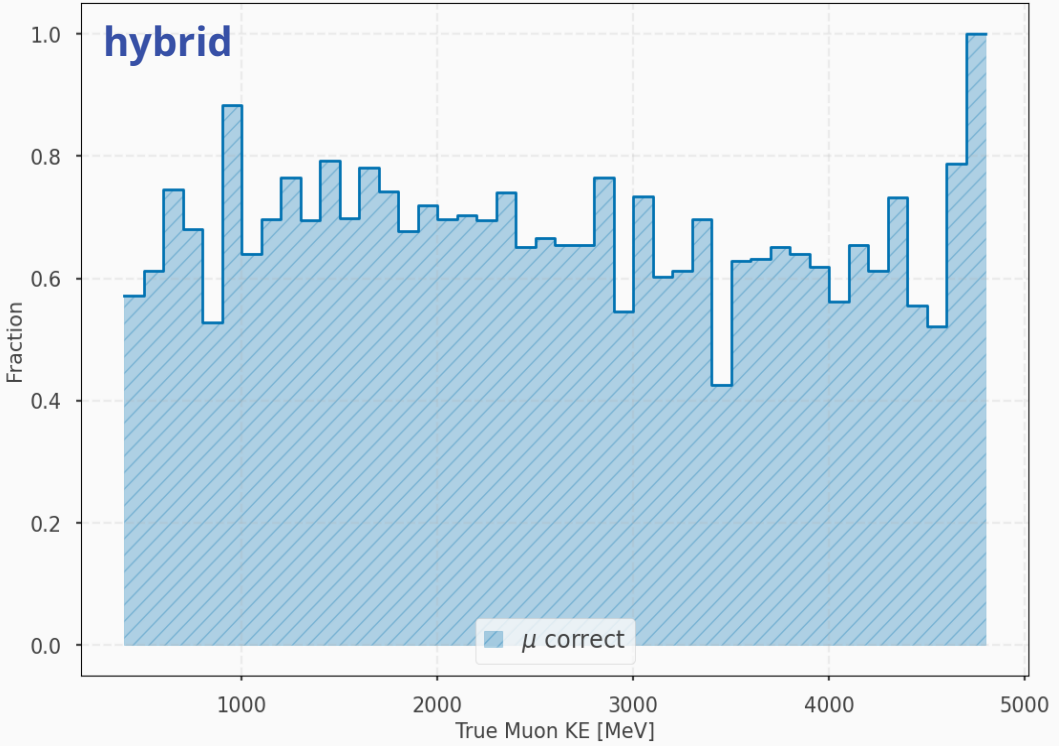
- Not identified: 55
- True μ: 1559
- True anti-μ: 0
- False μ: 0
- False anti-μ: 760 (incl. not id'ed)
- Efficiency: 68.9%

Only muons simulated

Charge ID

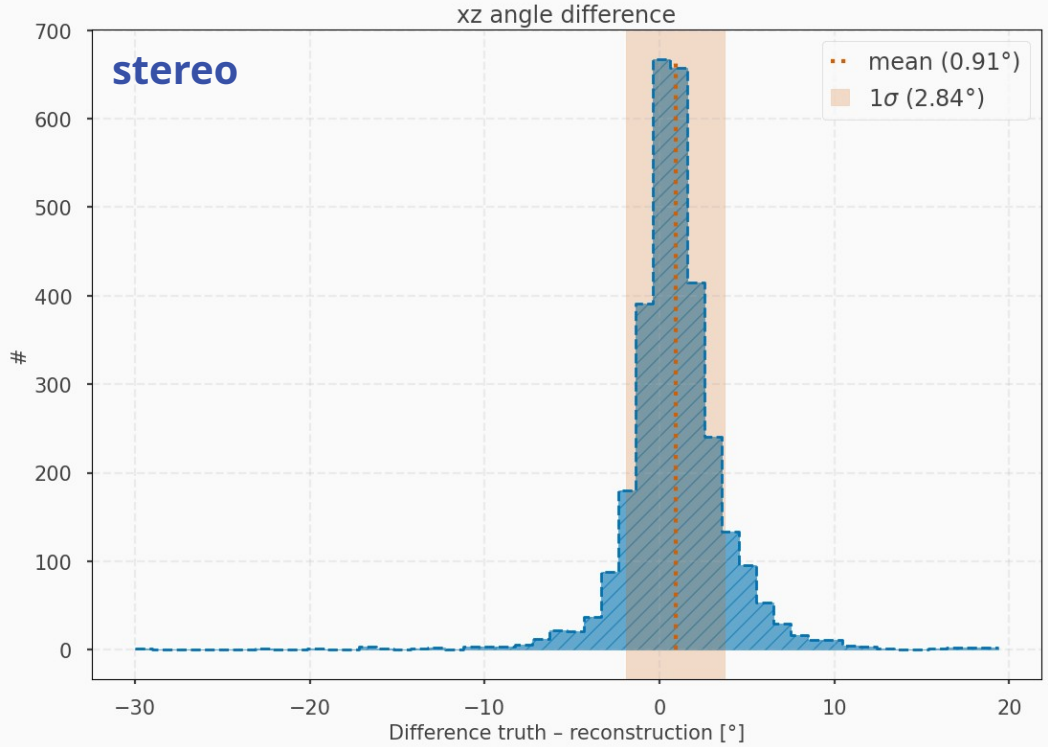
- Per KE slices

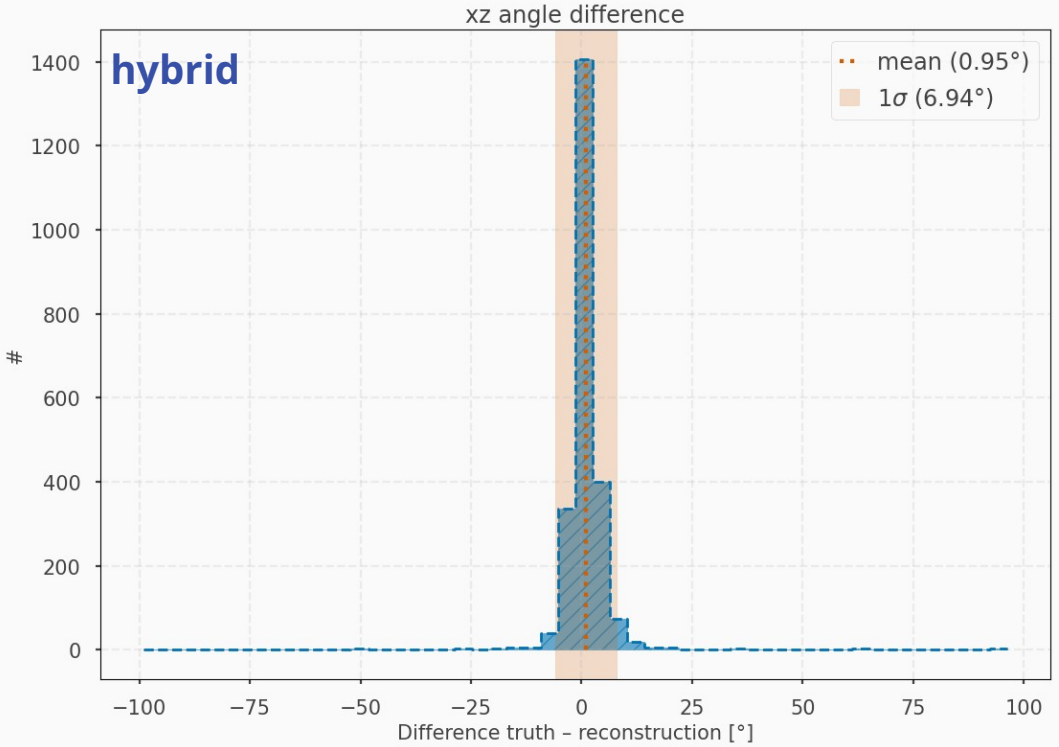




Angular resolution

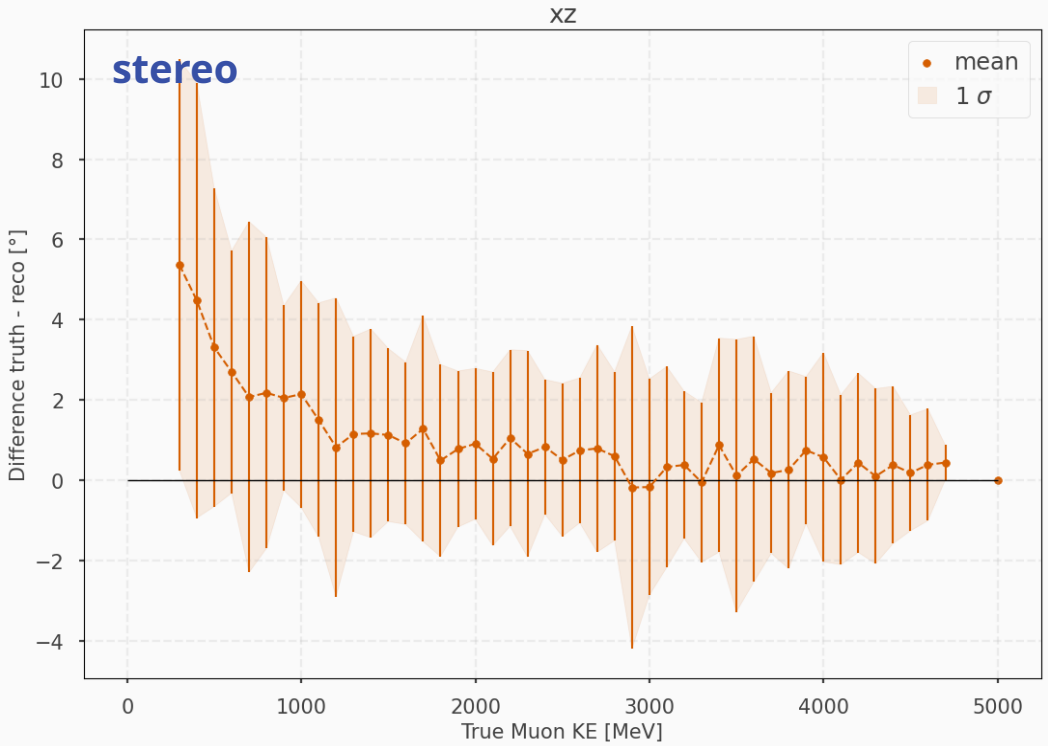
- In **xz** direction [θ = atan(x / z)]

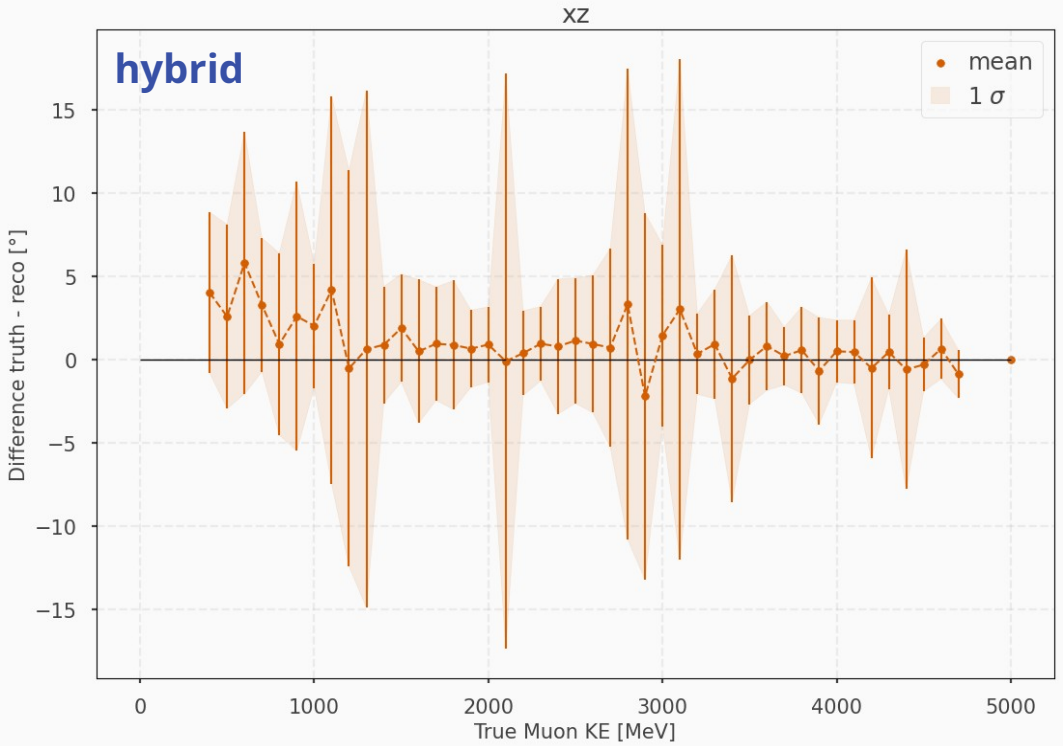




Angular resolution

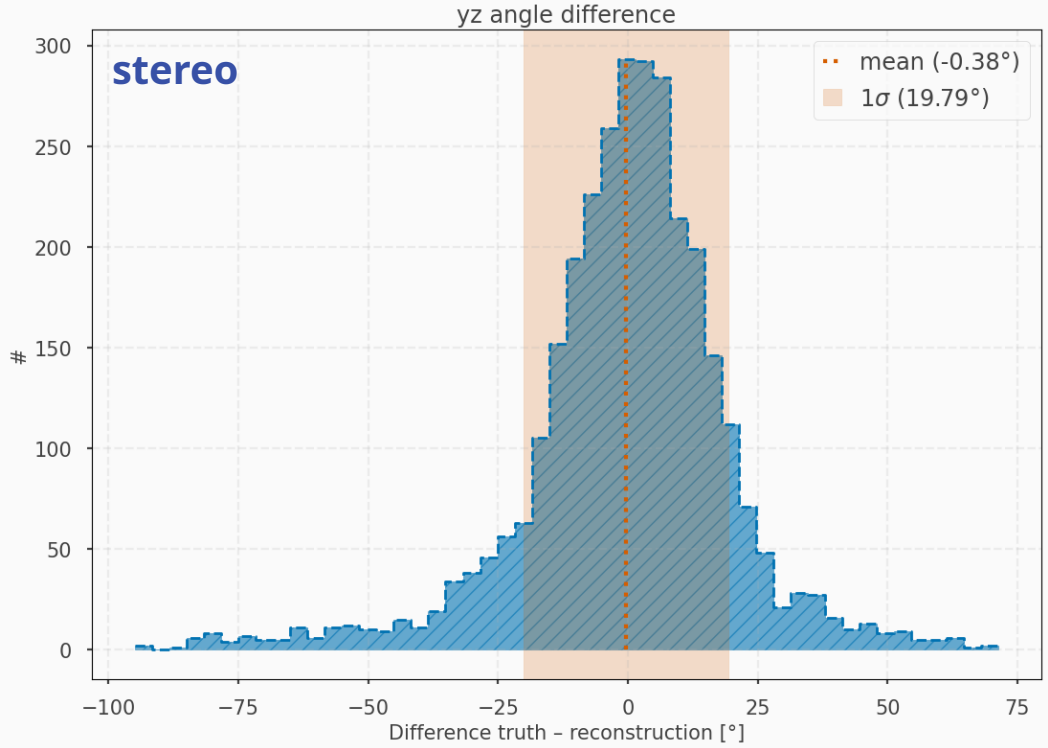
- In **xz** direction per KE slices [θ = atan(x / z)]

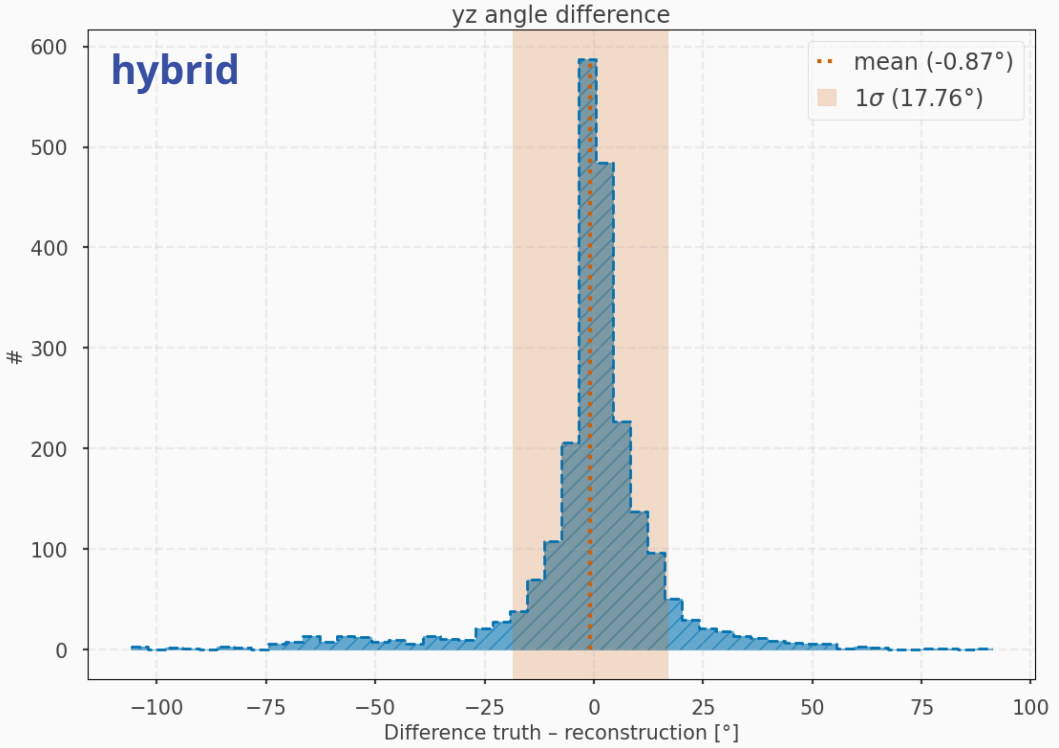




Angular resolution

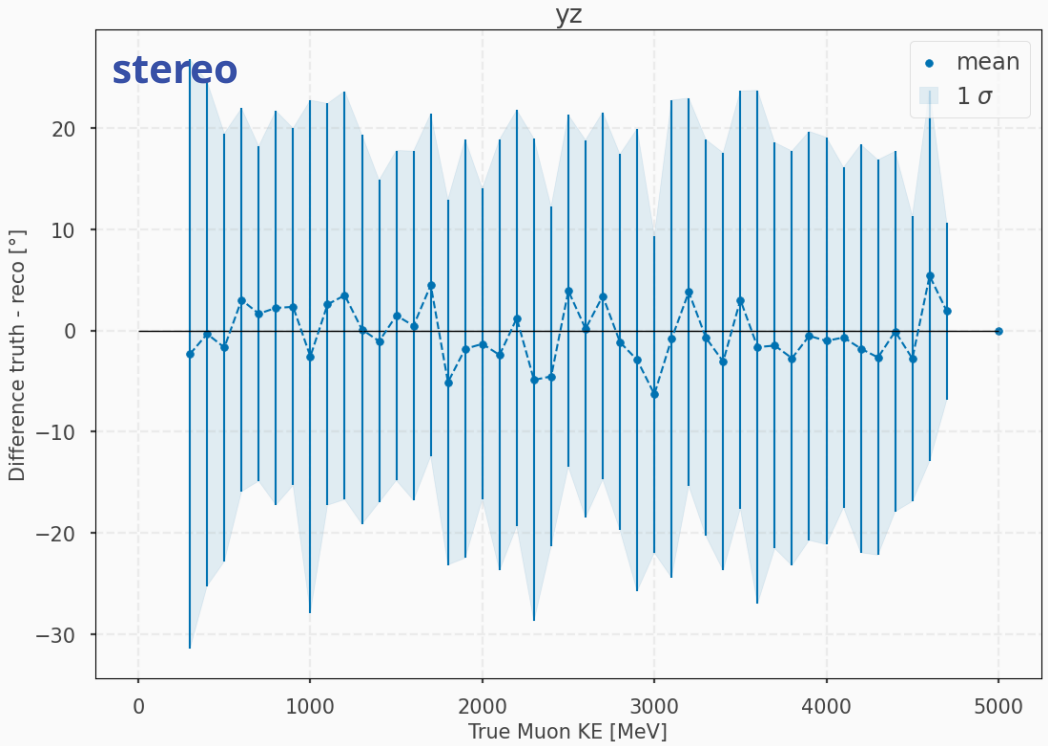
- In **yz** direction [θ = atan(y / z)]

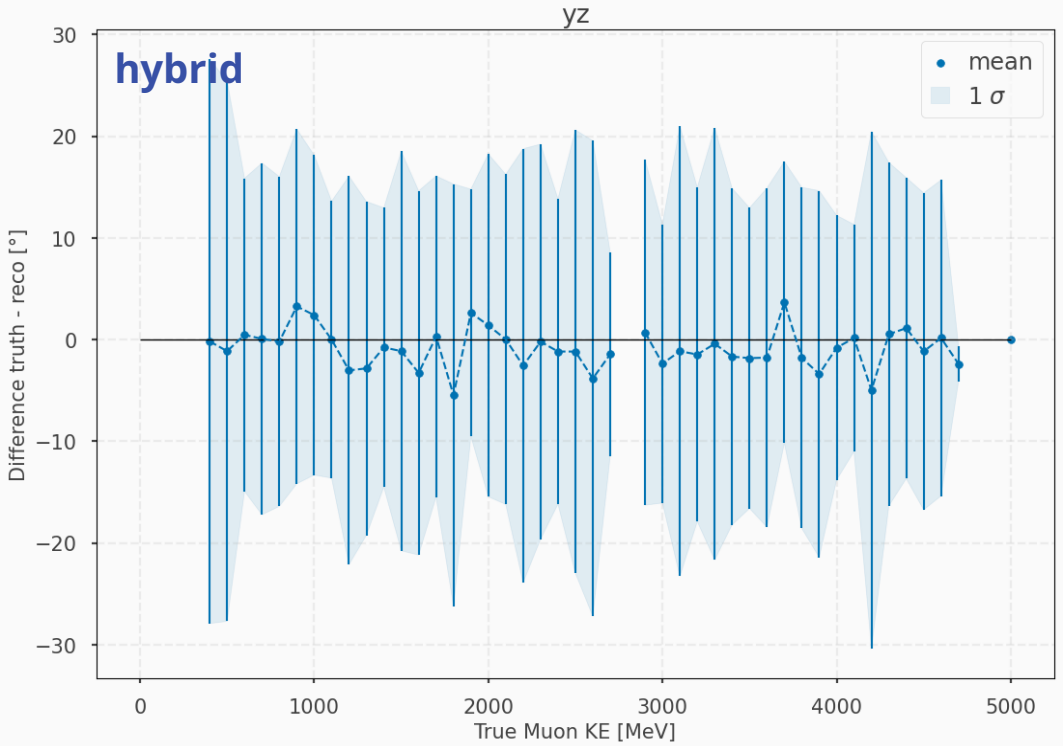




Angular resolution

- In **yz** direction per KE slices [θ = atan(y / z)]





Summary

- Evaluation script works as expected and allows comparison of different module orientation plans
- Correct performance evaluation criteria?
  - Add any?
  - Take any out?

- Once I have the ‘tiny’ production files: run the script on them and produce performance plots for PDR

Backup