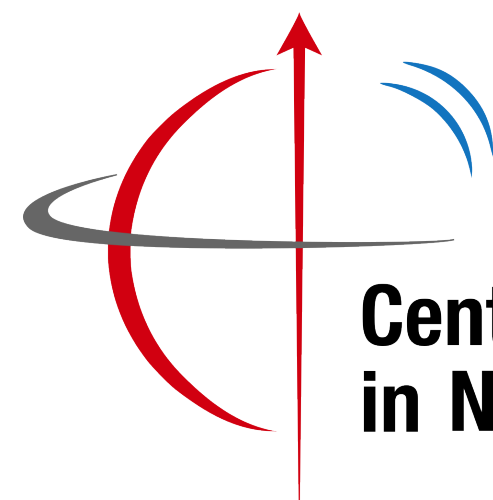


Coincidence & Dark Photon Search Update



Win Lin · Stony Brook University
Collaboration Meeting · 05/18/2026



Center for Frontiers
in Nuclear Science

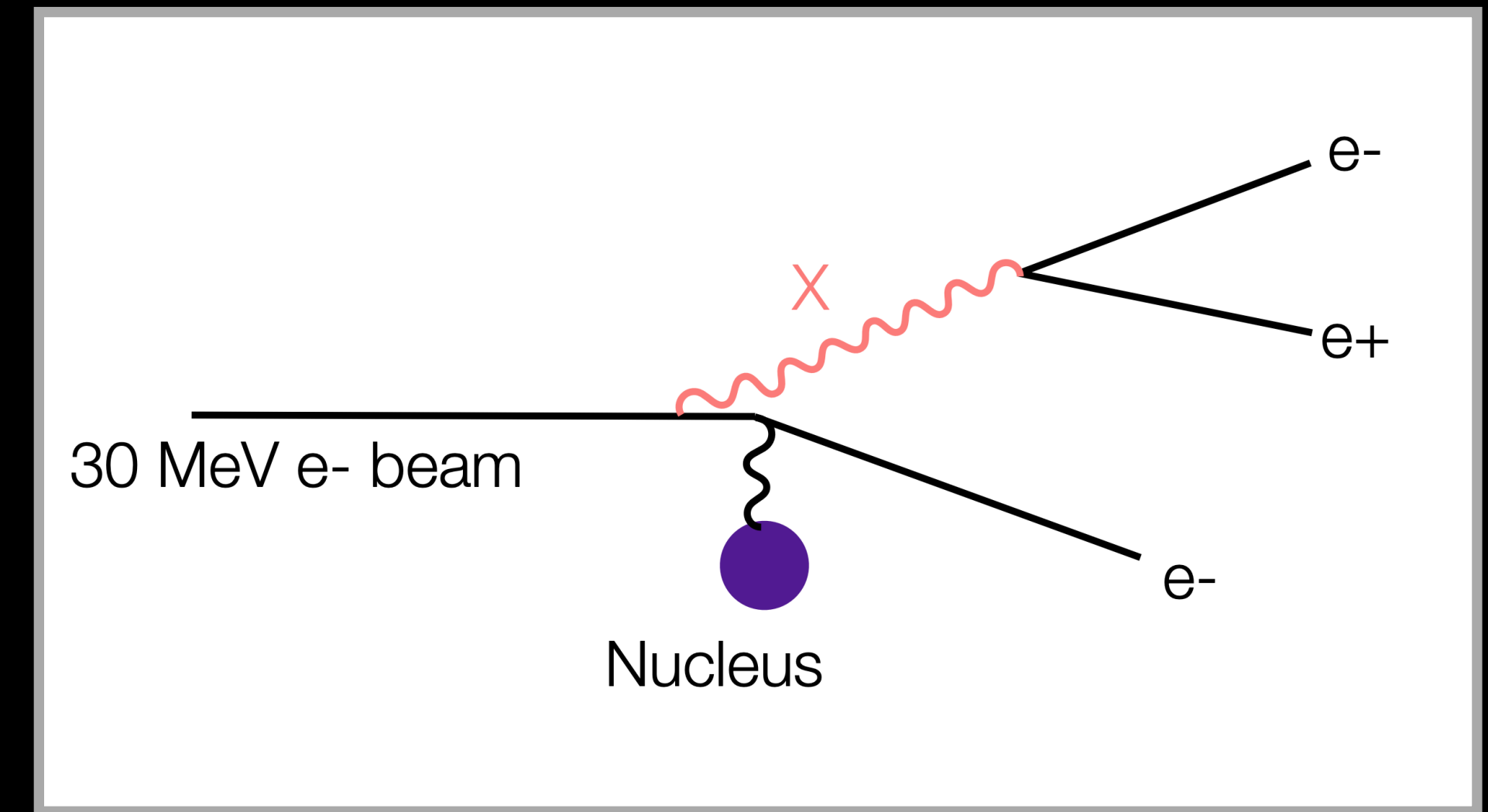


Stony Brook
University



What data do we have for

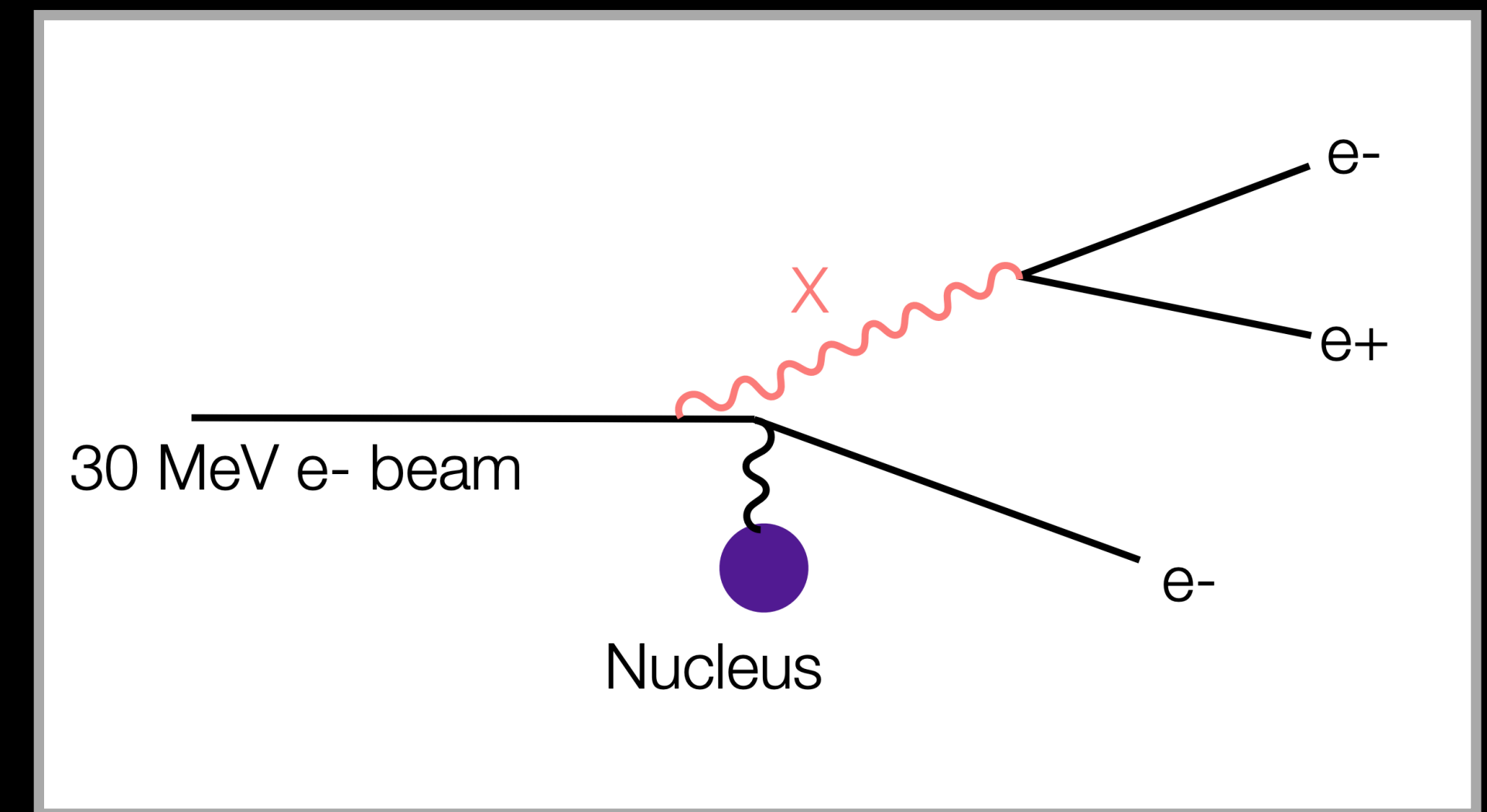
	Moller (3 GEM)	Moller (4 GEM)	Elastic (3 GEM)	Elastic (4 GEM)	Inelastic	Coincidence
10 MeV	✗	✓	✗	✓	✗	✗
15 MeV	✗	✓	✗	✓	✗	✗
20 MeV	✓	✗	✓	✗	✗	✗
25 MeV	✓	✗	✓	✗	✗ (maybe)	✓ (maybe)
30 MeV	✓	✗	✓	✗	✗ (maybe)	✓ (maybe)



- 107 confidence runs, 95,124,767 (raw) events, from Jan 27 - Feb 2
- No top right GEM .. very challenging to get angles
- Very large background
- As far as I know, we have not seen strong evidence of coincidence

What data do we have for

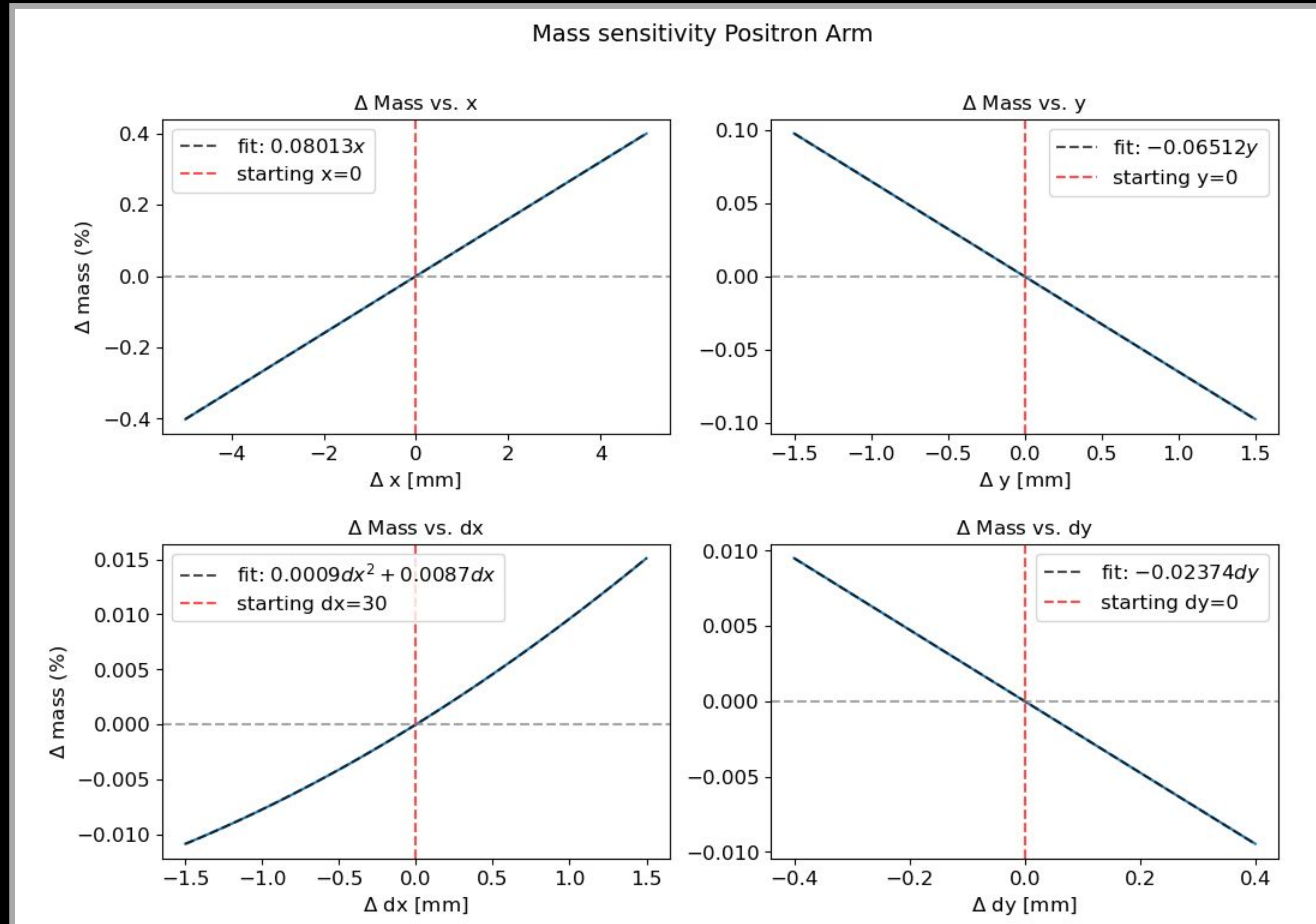
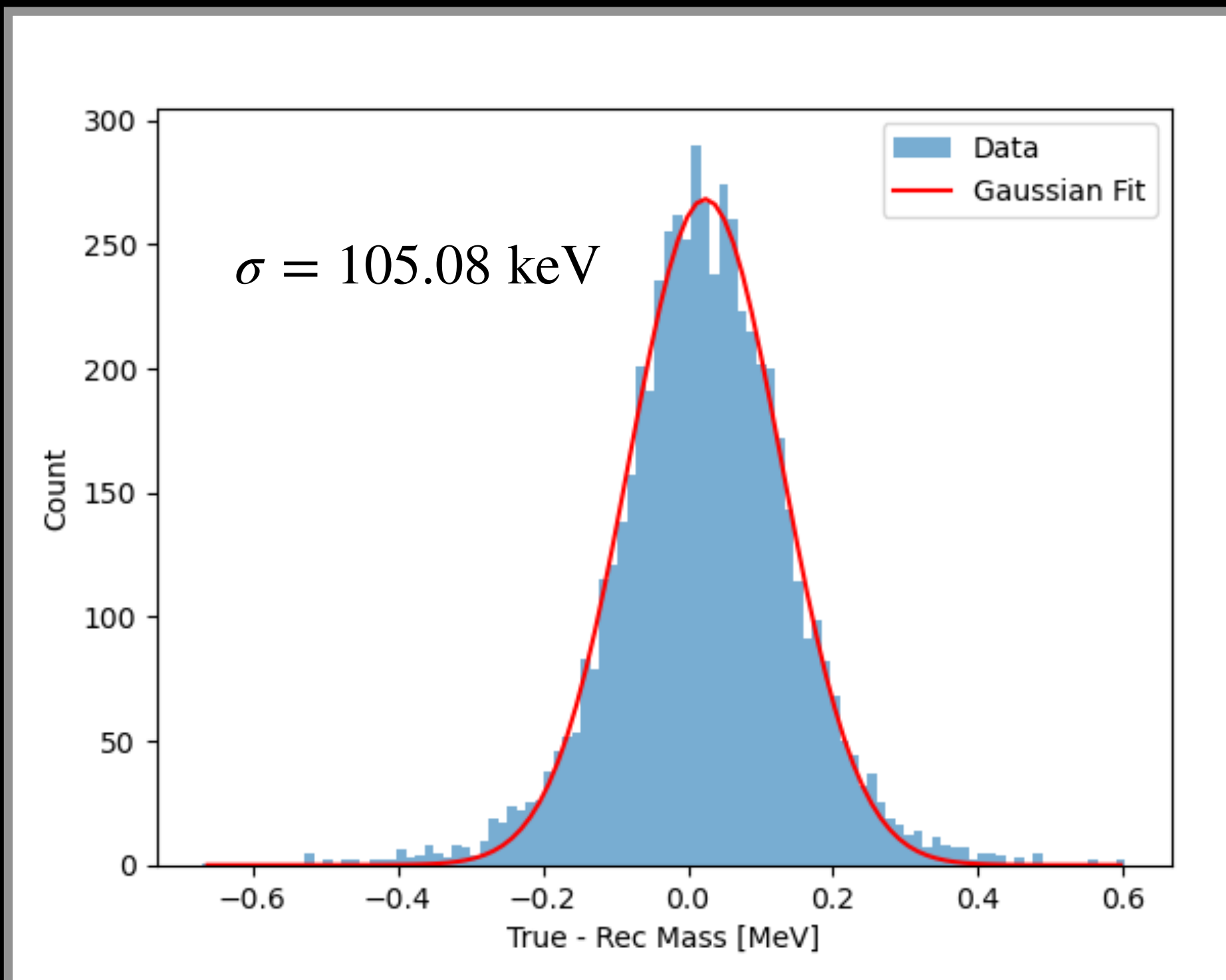
	Moller (3 GEM)	Moller (4 GEM)	Elastic (3 GEM)	Elastic (4 GEM)	Inelastic	Coincidence
10 MeV	✗	✓	✗	✓	✗	✗
15 MeV	✗	✓	✗	✓	✗	✗
20 MeV	✓	✗	✓	✗	✗	✗
25 MeV	✓	✗	✓	✗	✗ (maybe)	✓ (maybe)
30 MeV	✓	✗	✓	✗	✗ (maybe)	✓ (maybe)



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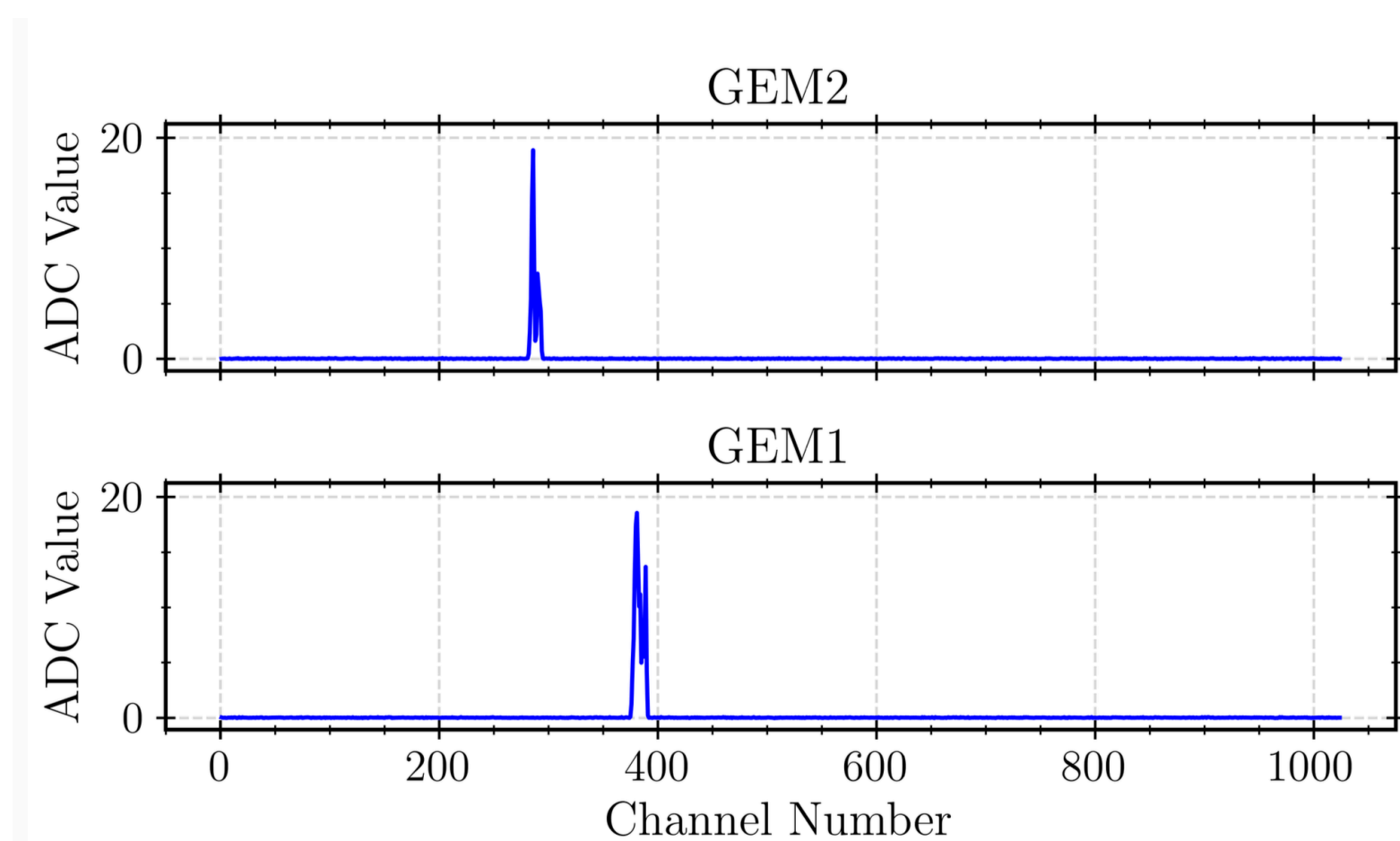
Can we do reconstruction with 3 GEMS?



Track and vertex angles

- Can potentially obtain from GEM timing
- And/or machine learning reconstruction from ADC distribution

Event display of a simulated large angle track

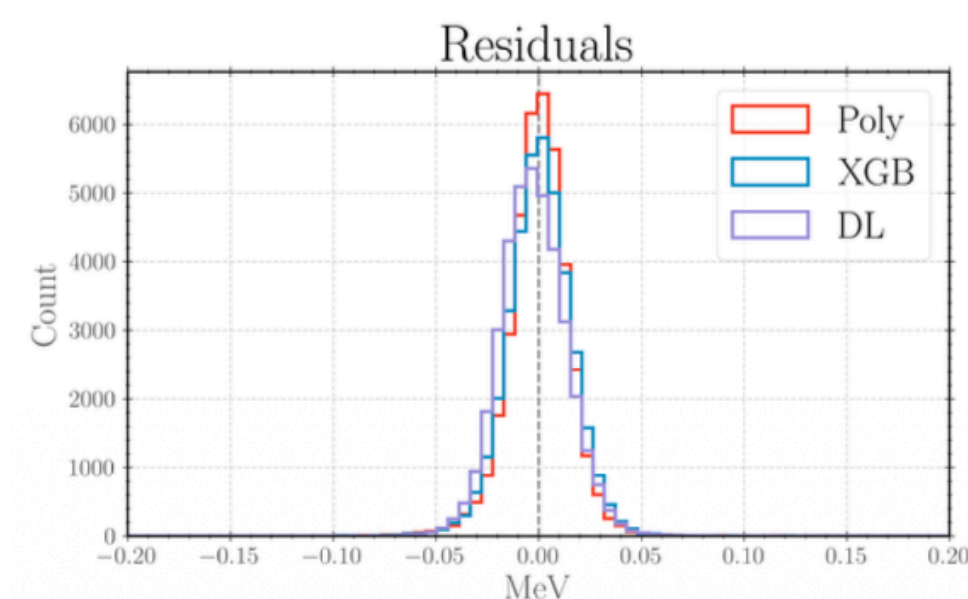


ADC → Kinematics

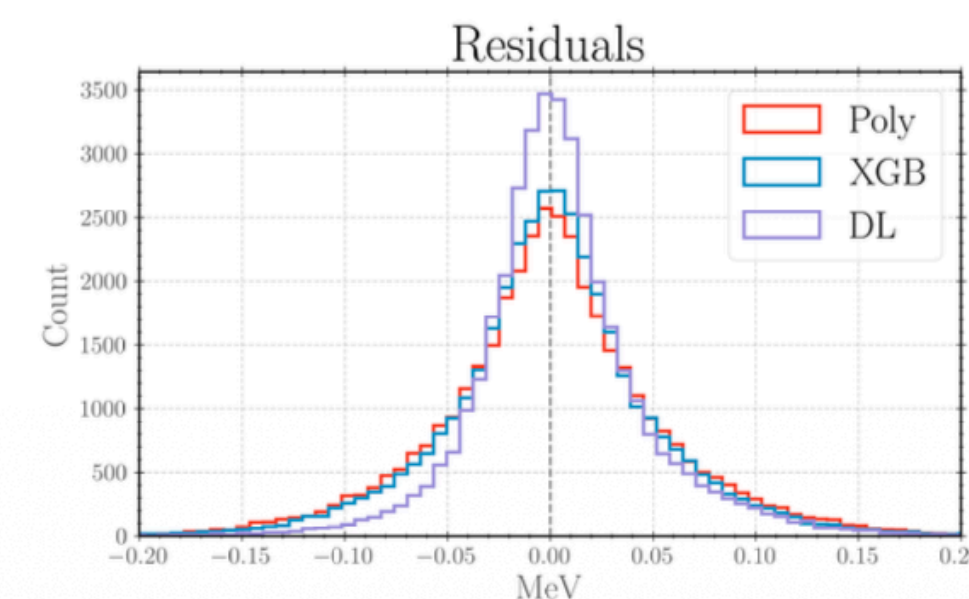
Model	MSE
Polynomial	0.00196
XGB	0.00178
DL	0.00192

Model	MSE
Polynomial	0.00574
XGB	0.00459
DL	0.00377

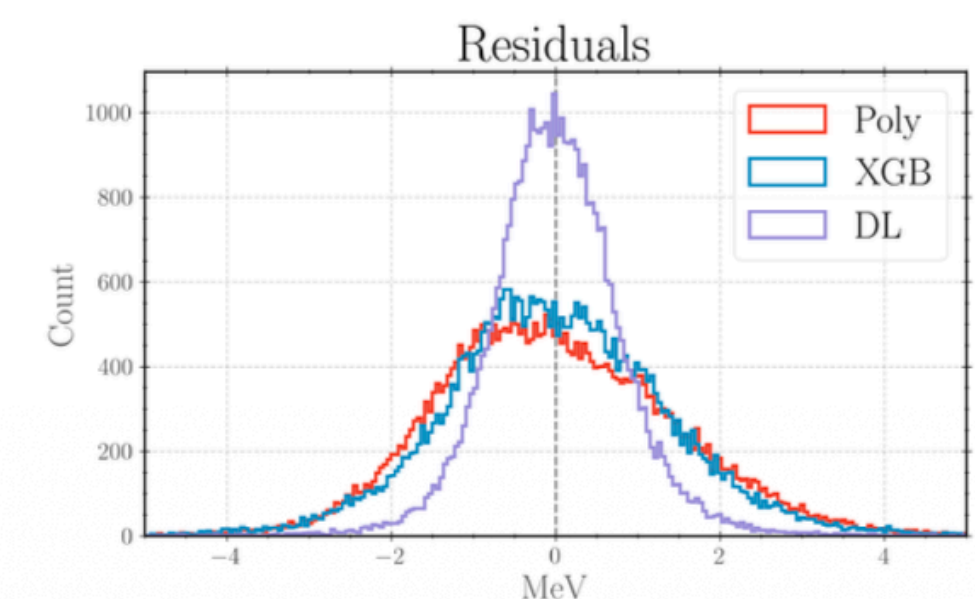
Model	MSE
Polynomial	2.299
XGB	1.928
DL	0.714



Momentum

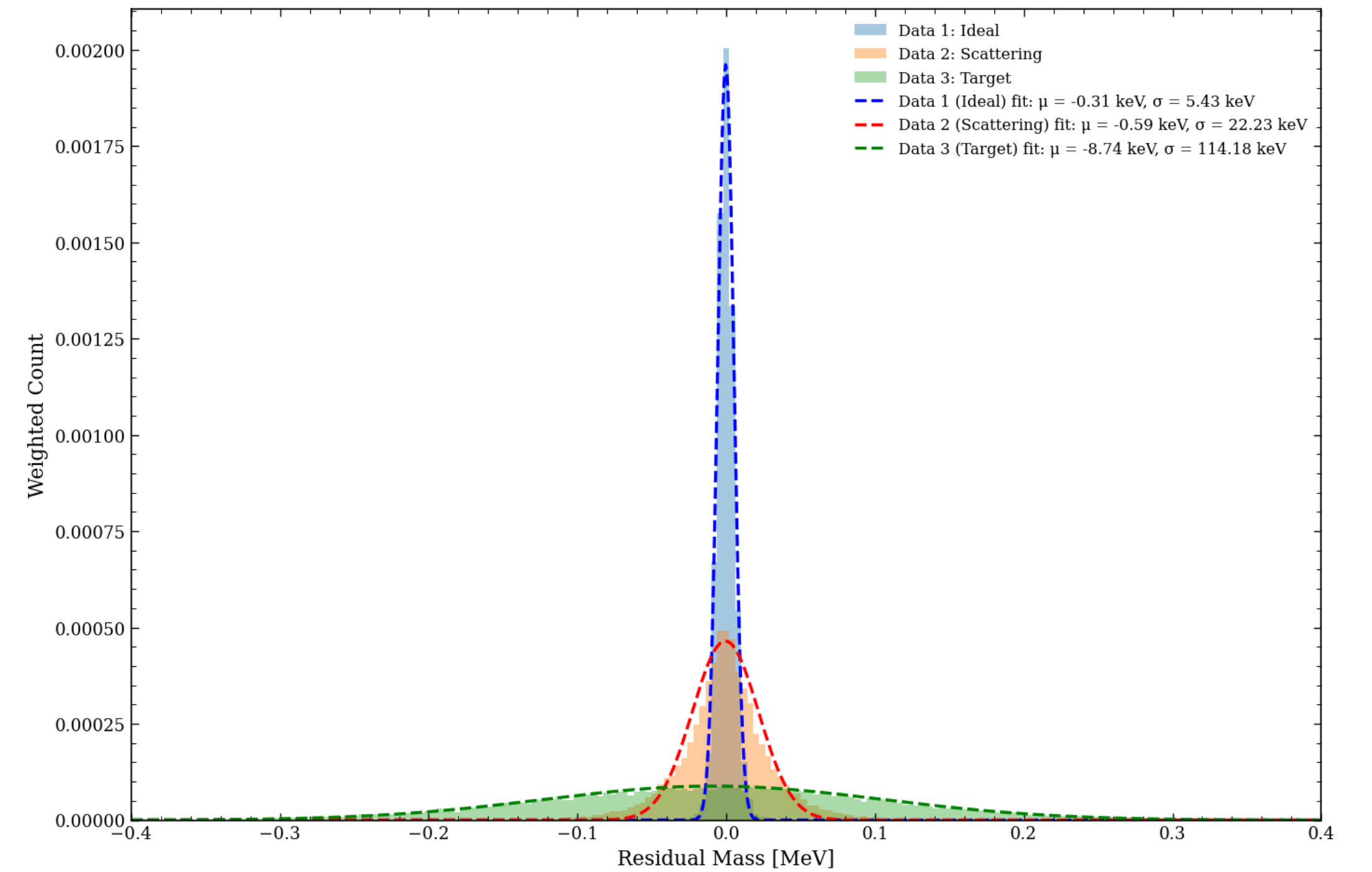
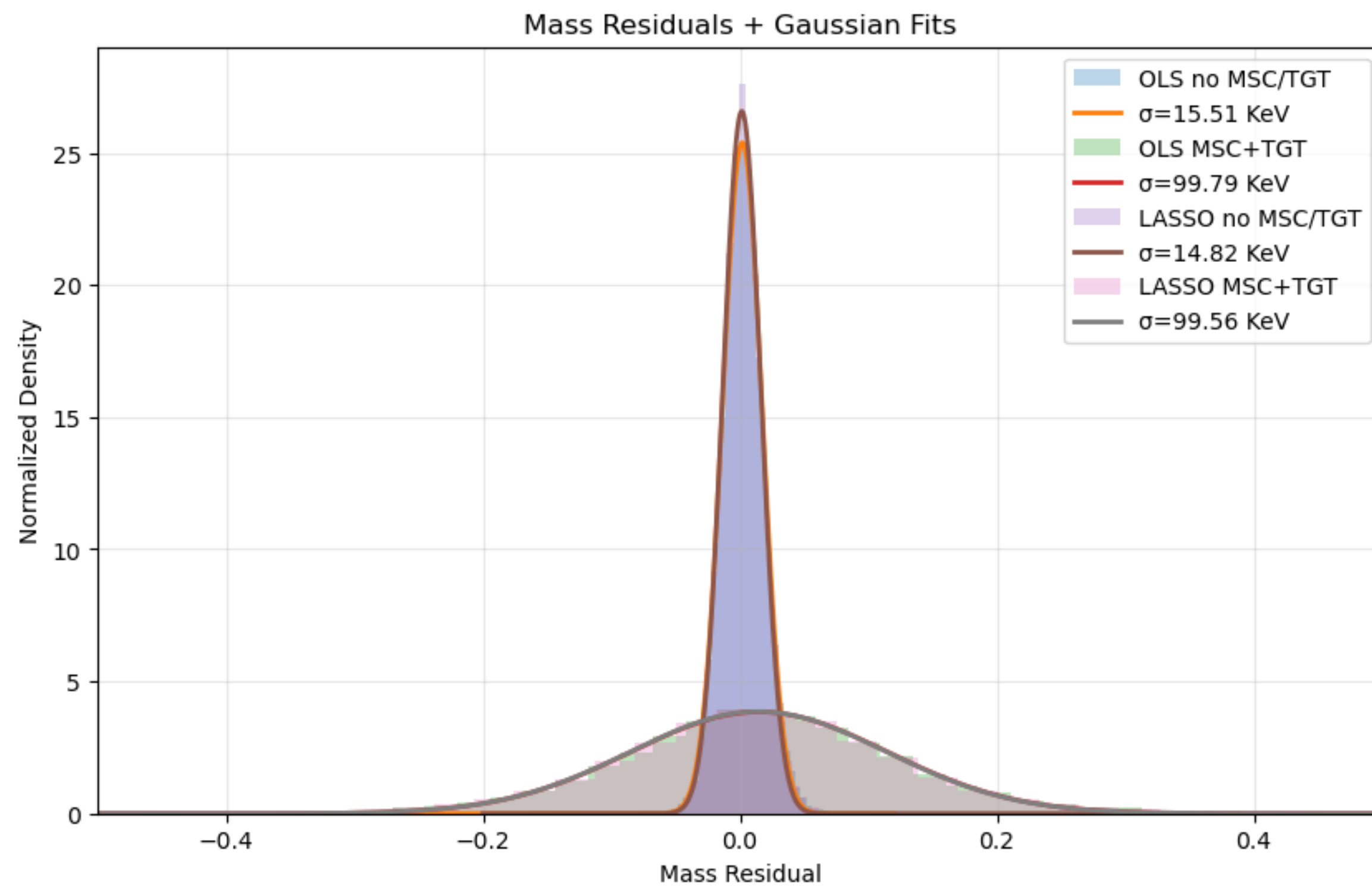


In-Plane Angle



Out-of-Plane Angle

Simulation and projected mass



Data analysis ..

Um ..

**detector level calibration
+ analysis first ..**

Summary & outlook

Challenging but we will get there!

Get to work!

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