

Møller Vertex Target Scan

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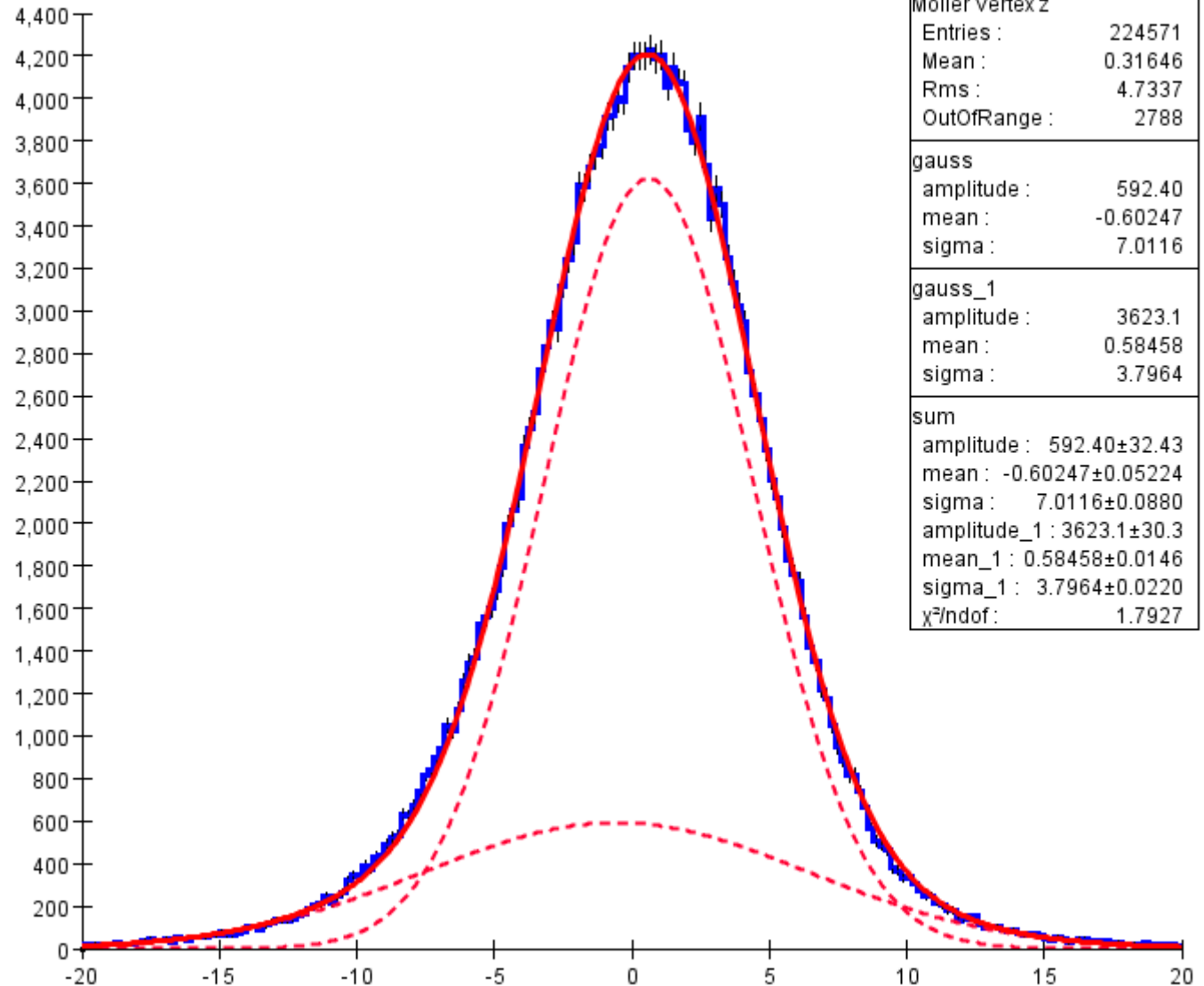
Determining Target Z Position

- The Møller invariant mass peak provides us not only a mass calibration point, it also allows us to determine the target z position.
 - 1) Using the vertex position of the Unconstrained Vertices
 - 2) Check by requiring the Target Constrained vertex mass to equal the Unconstrained vertex mass (constraint should only affect the resolution).

2015 Møller Vertex Z Position

■ $z=0.585\pm 0.015$

2015 Møller Unconstrained Vertex Z Position

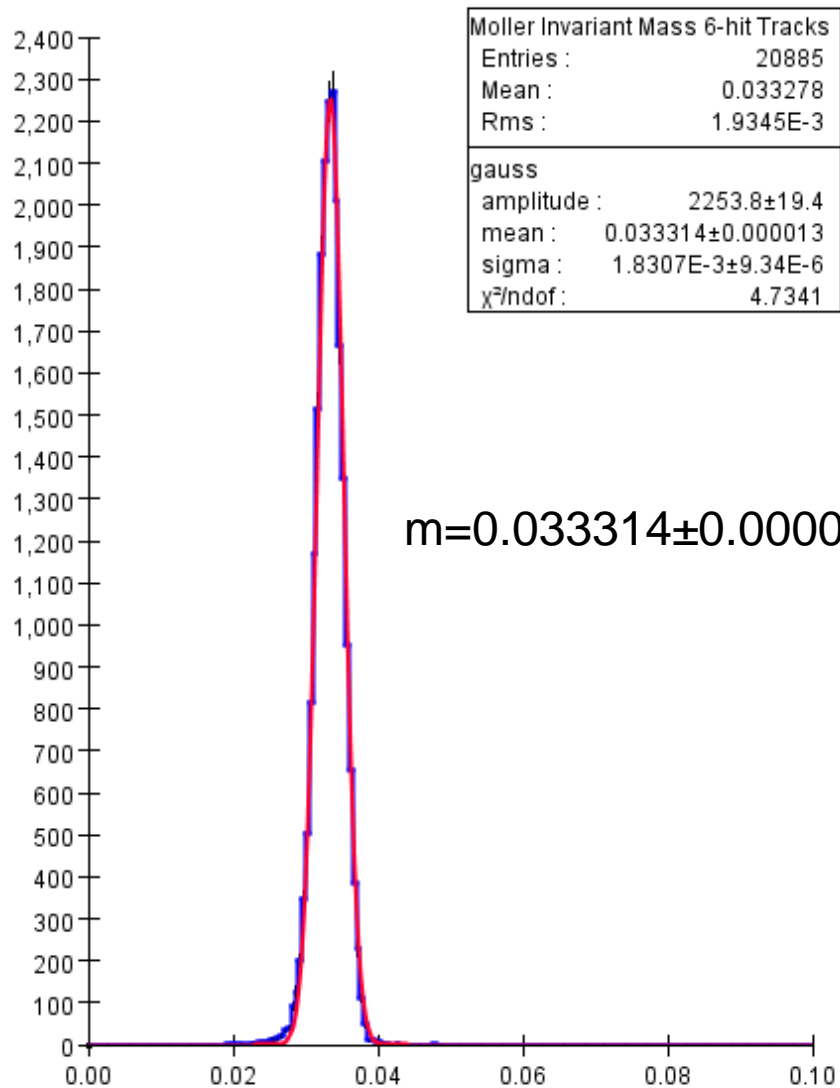


Target Position Consistency Check

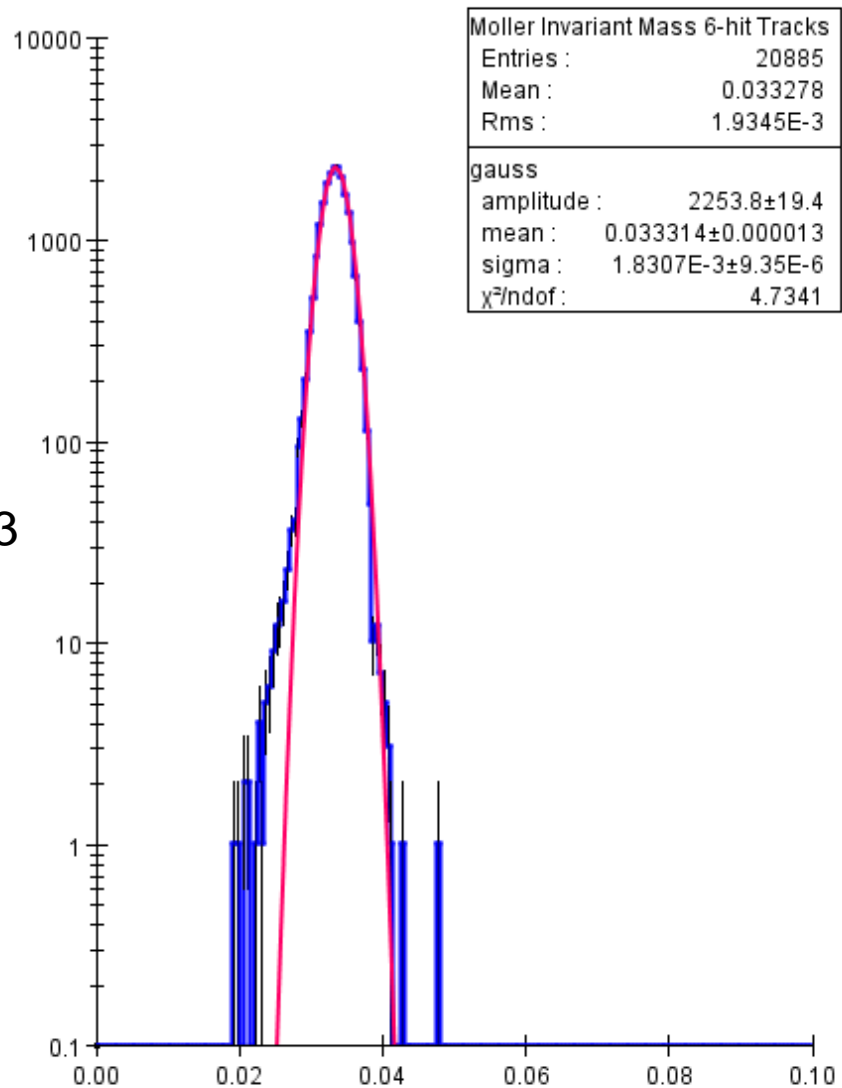
- Plot Target Constrained mass for a number of target z positions.
- Compare to mass determined from the Unconstrained fit.
- Using only 6-hit tracks from Run 5772 reconstructed with the HPS-EngRun2015-Nominal-v6-0-fieldmap detector for this analysis.

Unconstrained Mass

Run 5772 Møller Candidate 6-hit Tracks Unconstrained Ver...

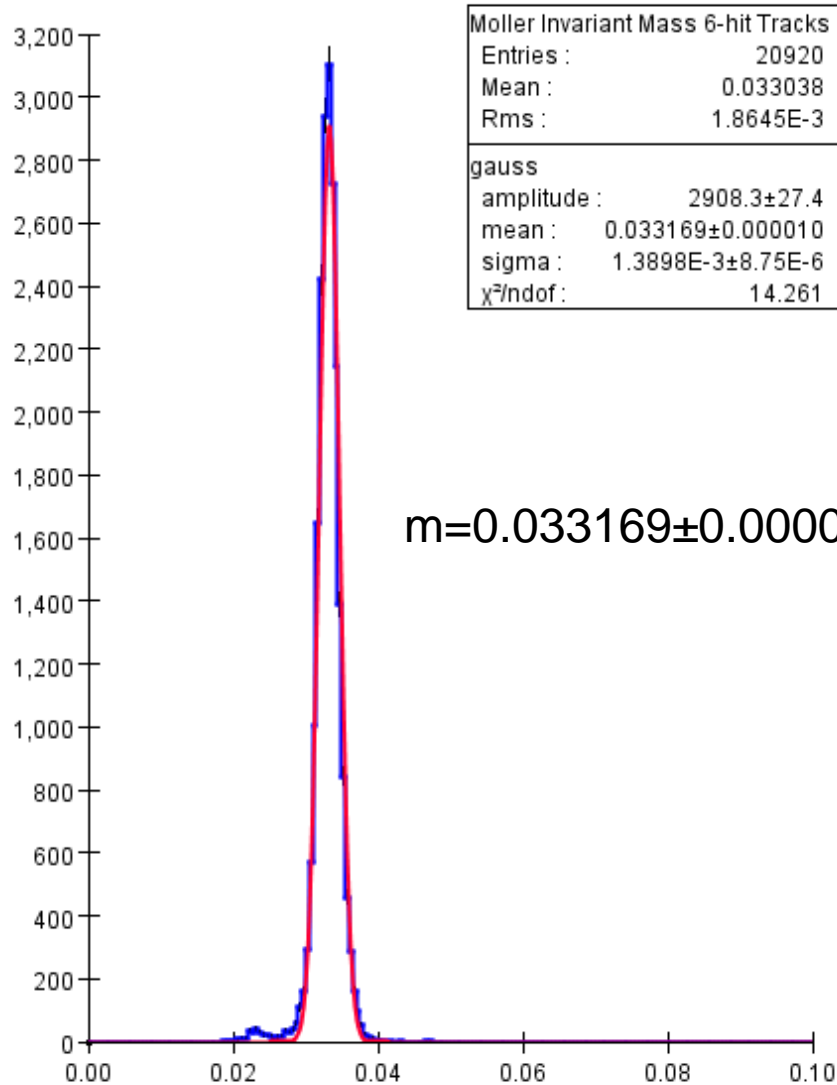


Run 5772 Møller Candidate 6-hit Tracks Unconstrained Ver...

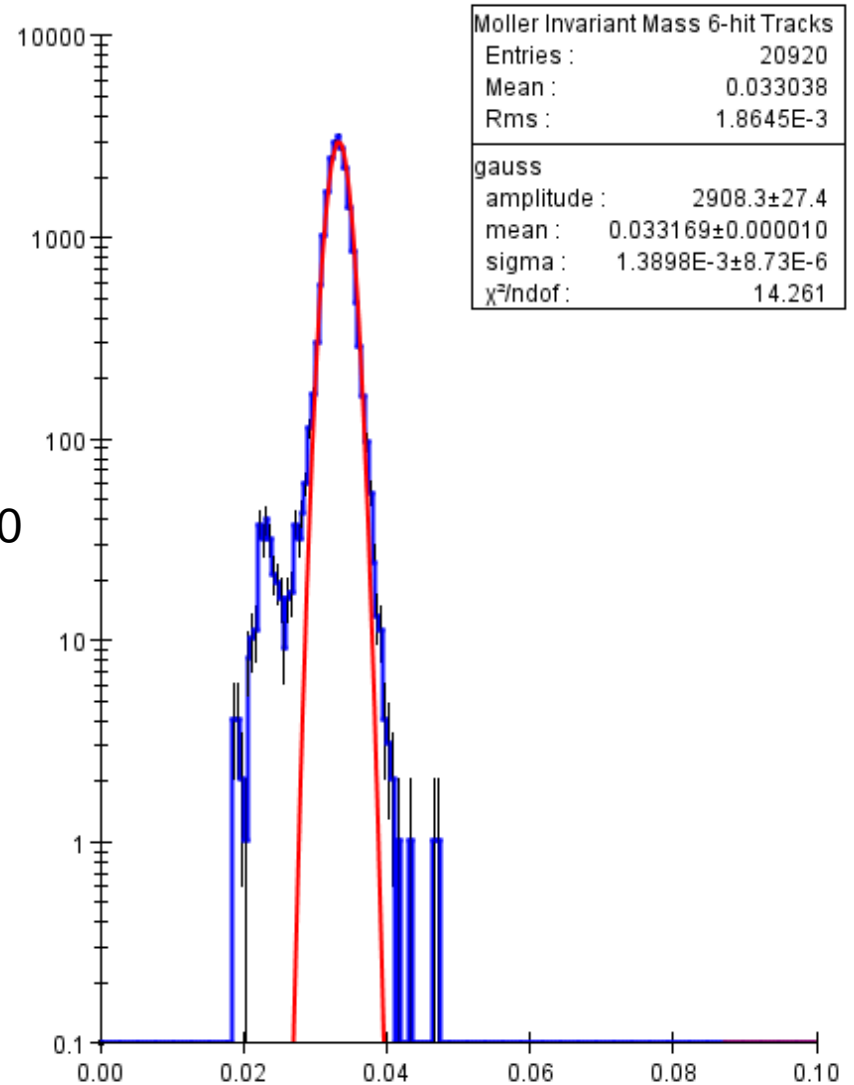


Target Constrained Mass $z = 0.0\text{mm}$

Run 5772 Møller Candidate 6-hit Tracks Target $z=0.0$

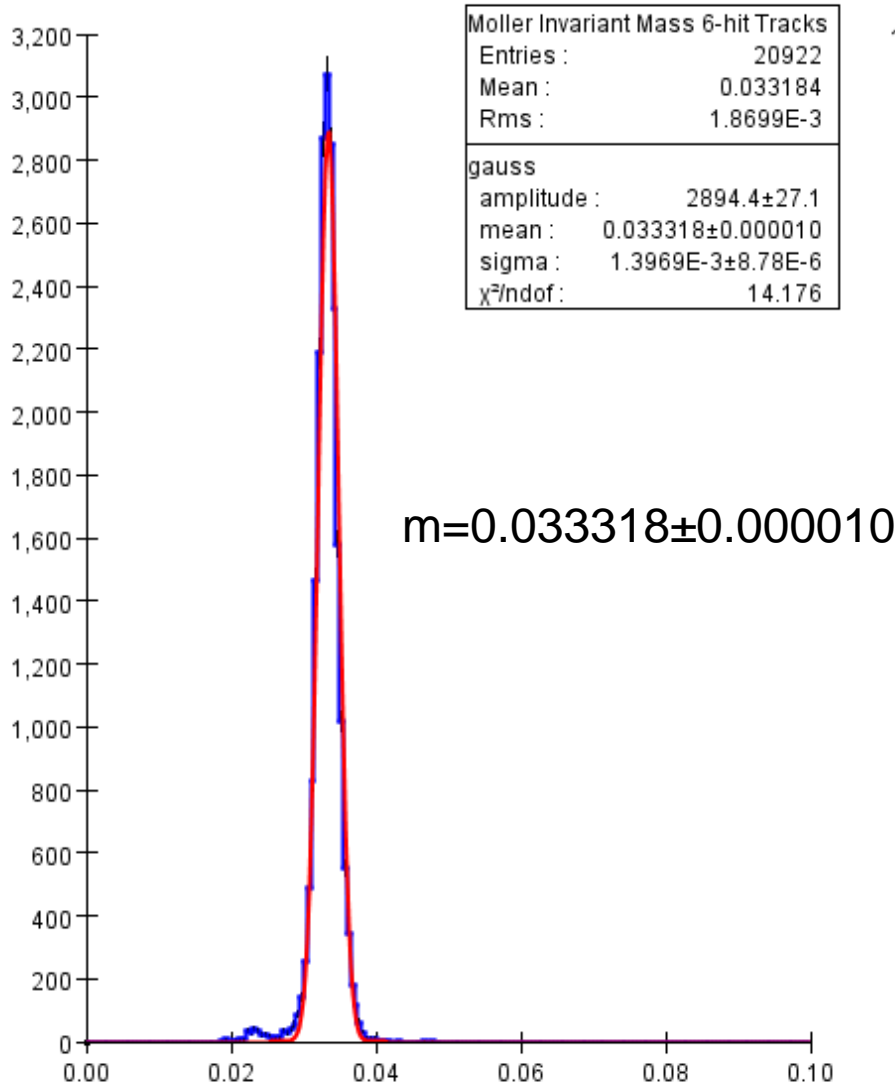


Run 5772 Møller Candidate 6-hit Tracks Target $z=0.0$

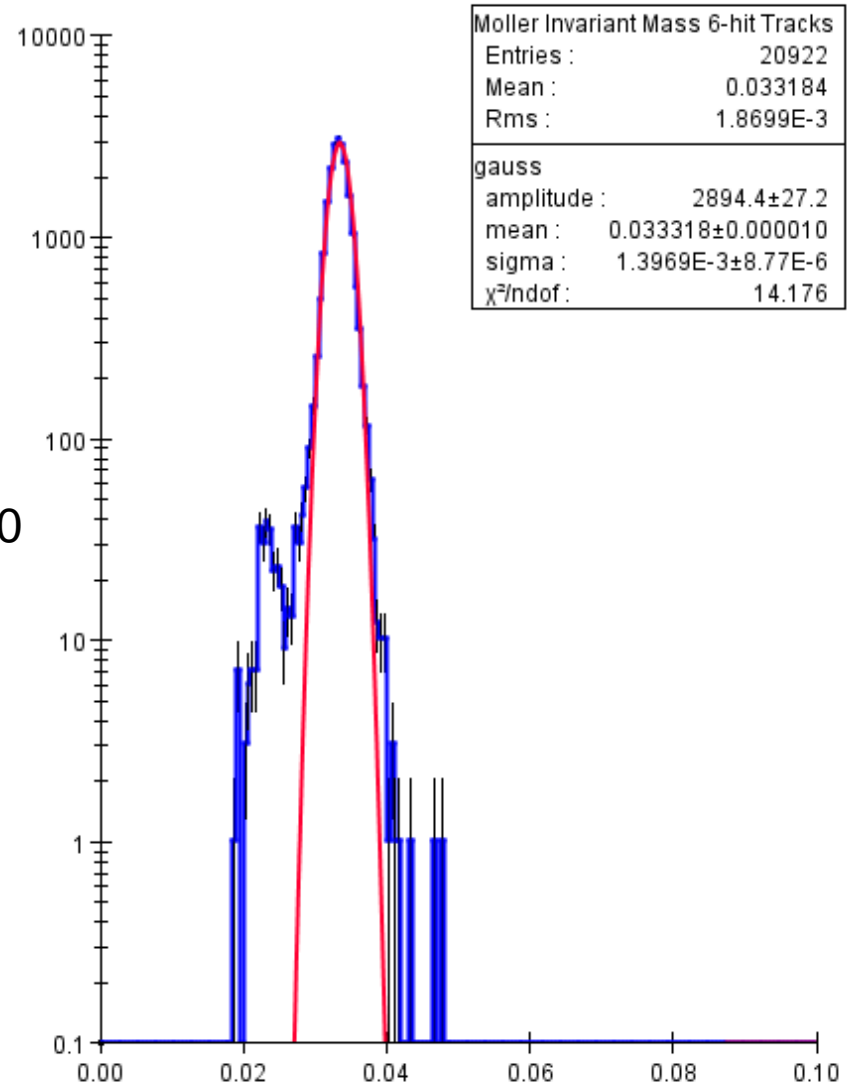


Target Constrained Mass $z = 0.5\text{mm}$

Run 5772 Møller Candidate 6-hit Tracks Target $z=0.5$

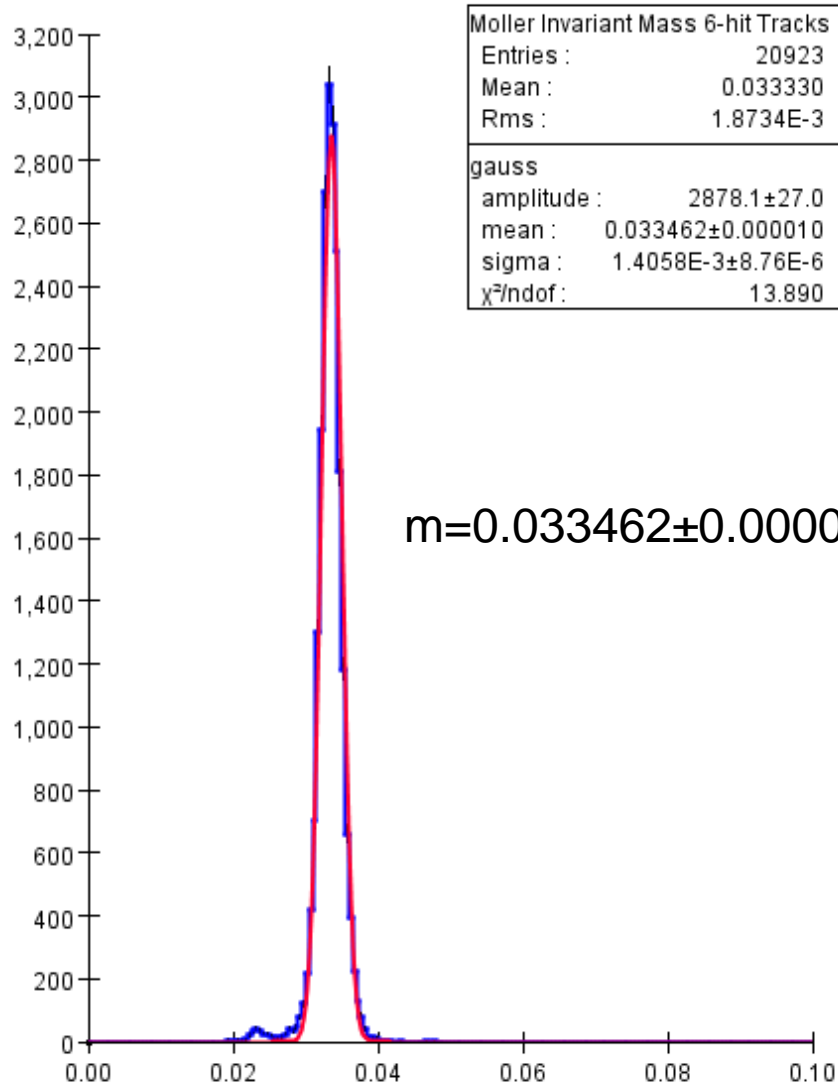


Run 5772 Møller Candidate 6-hit Tracks Target $z=0.5$

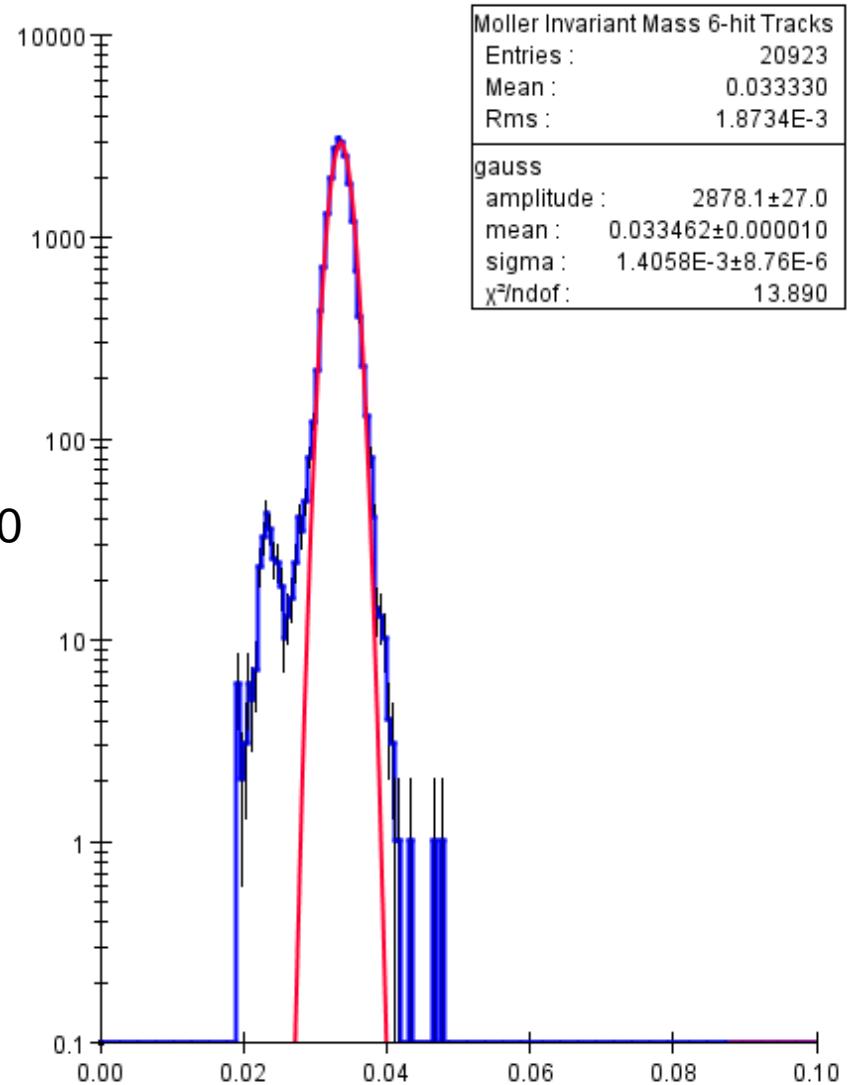


Target Constrained Mass $z = 1.0\text{mm}$

Run 5772 Møller Candidate 6-hit Tracks Target $z=1.0$

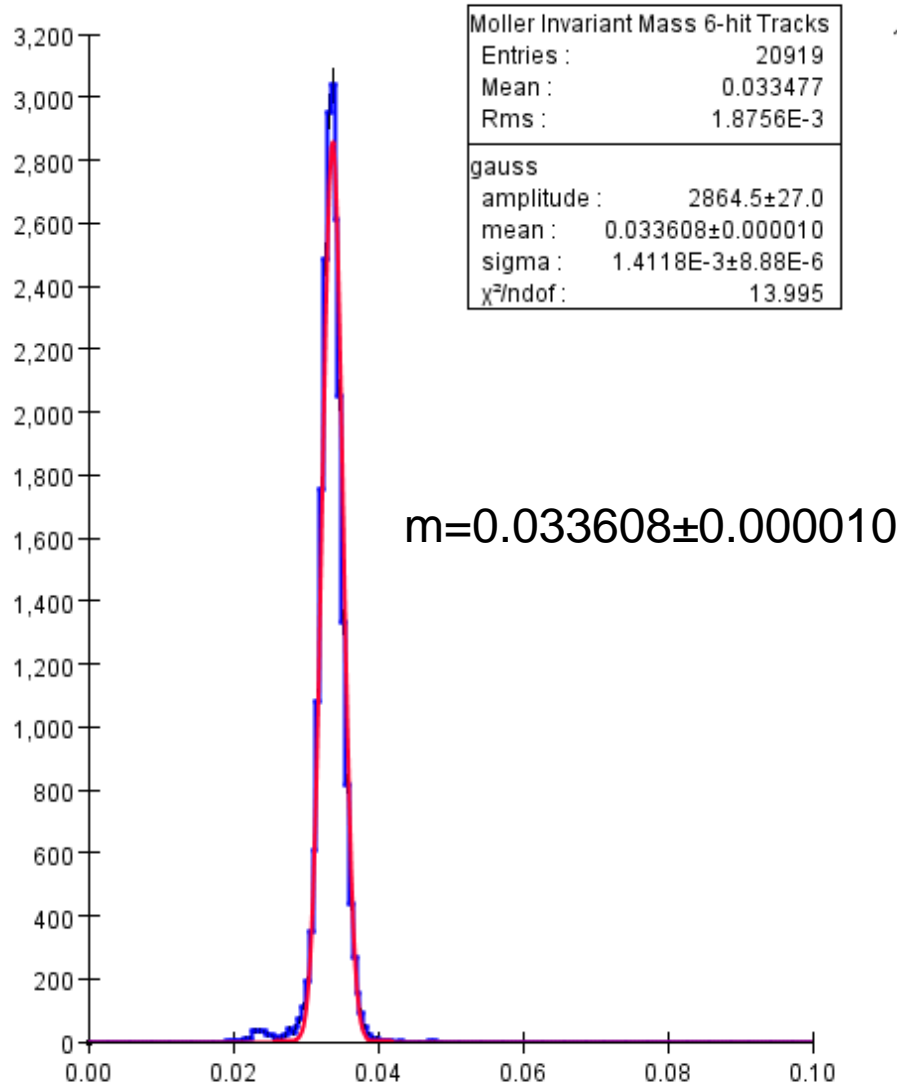


Run 5772 Møller Candidate 6-hit Tracks Target $z=1.0$

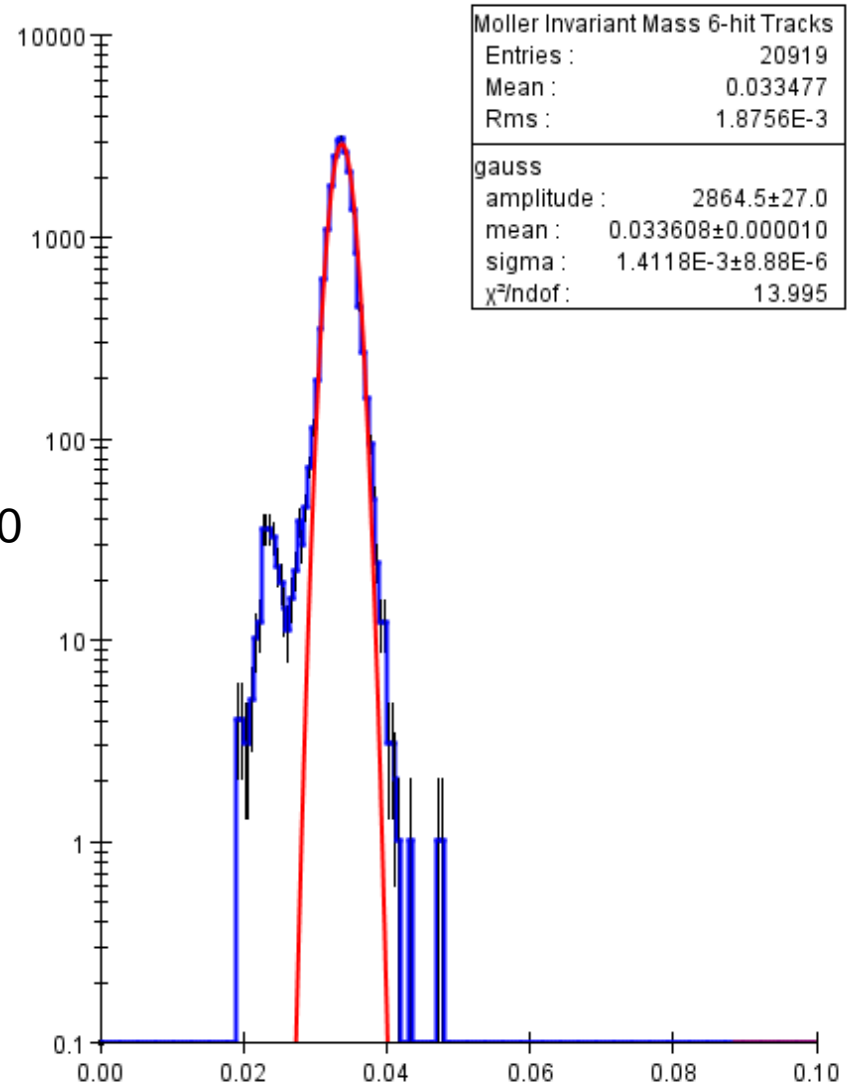


Target Constrained Mass $z = 1.5\text{mm}$

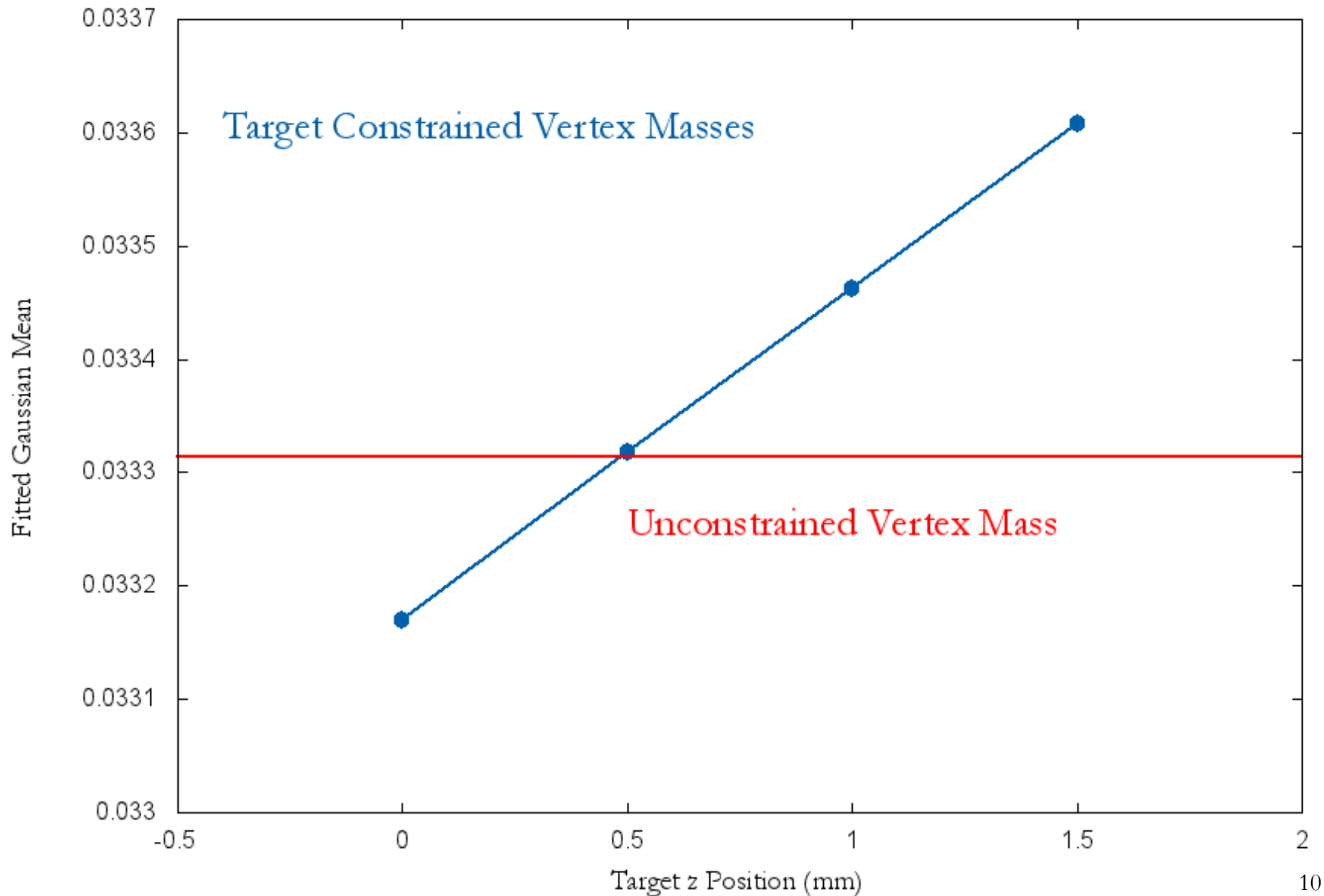
Run 5772 Møller Candidate 6-hit Tracks Target $z=1.5$



Run 5772 Møller Candidate 6-hit Tracks Target $z=1.5$



Target Constrained Mass vs Z Position



Conclusion

- Both the explicit target z position determination from the unconstrained vertex analysis and the implicit target z position derived from requiring the unconstrained and target-constrained masses to be equal point to a target z position of

$$Z = +0.5\text{mm}$$