Where's the Ecal, part II?

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SVT/ECAL Y-Misalignment

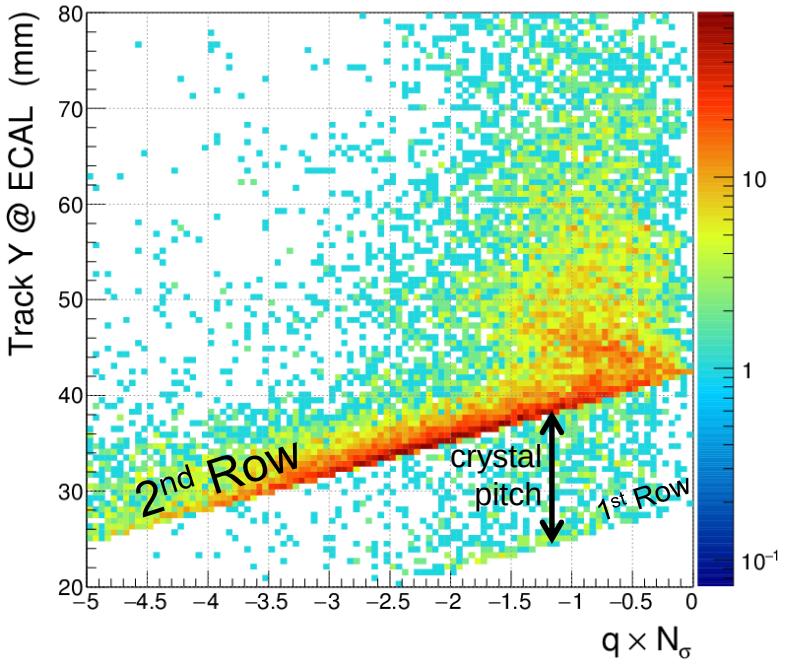
N. Baltzell, 12/16/16

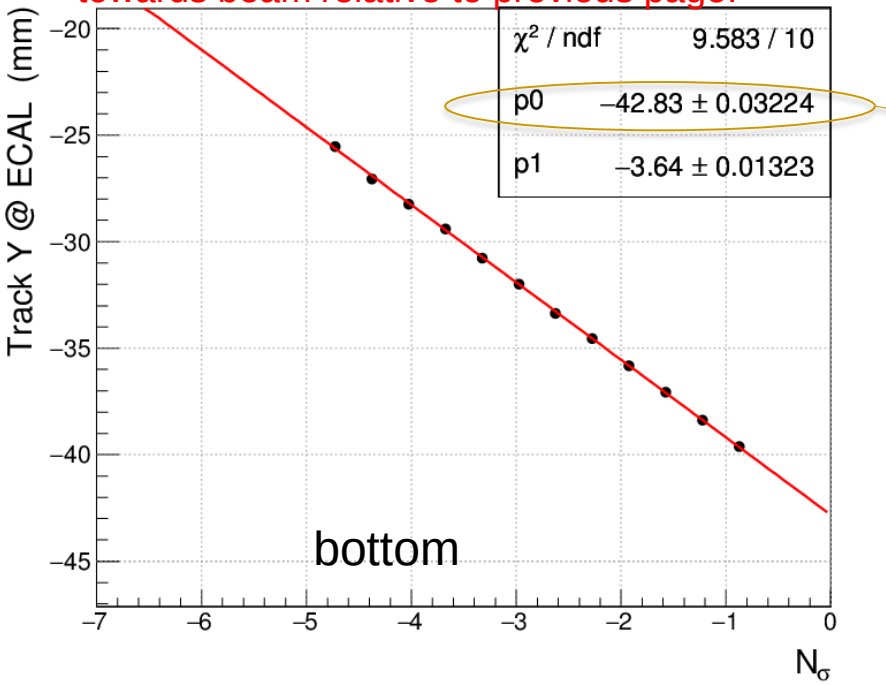
A more precise way to measure it.

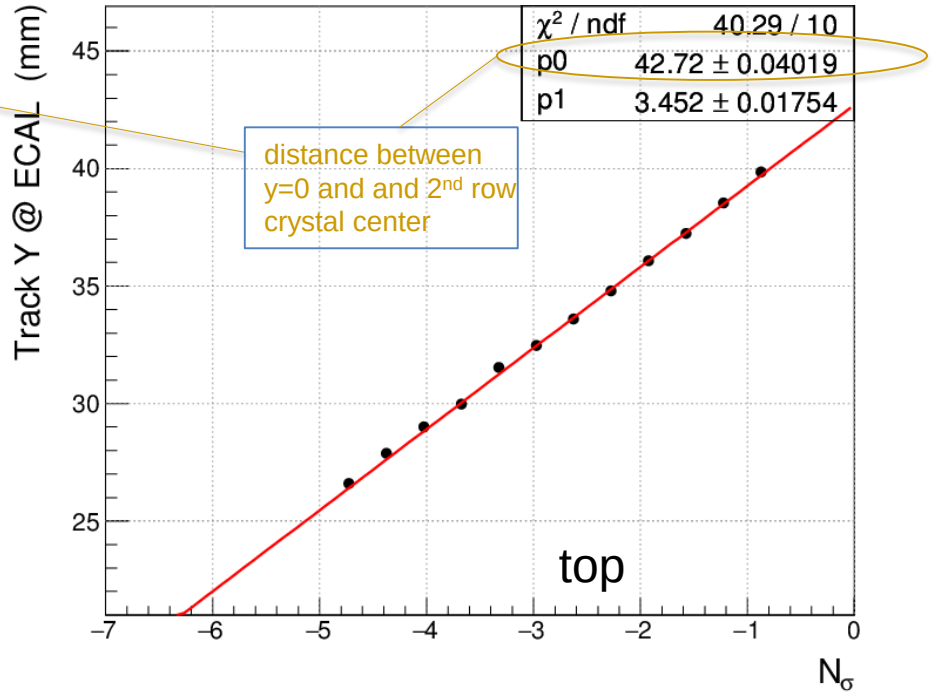
Use fact that lowest possible reconstructed ECAL position is half-crystal from edge.

Then sharp drop off in y is just middle of 1st/2nd row, and their y-intercept (N_σ=0) is crystal center.

Result is again very symmetric 22.3/22.4 mm ECAL
beam gaps for top/bottom, with half-mm shift towards beam relative to previous page.



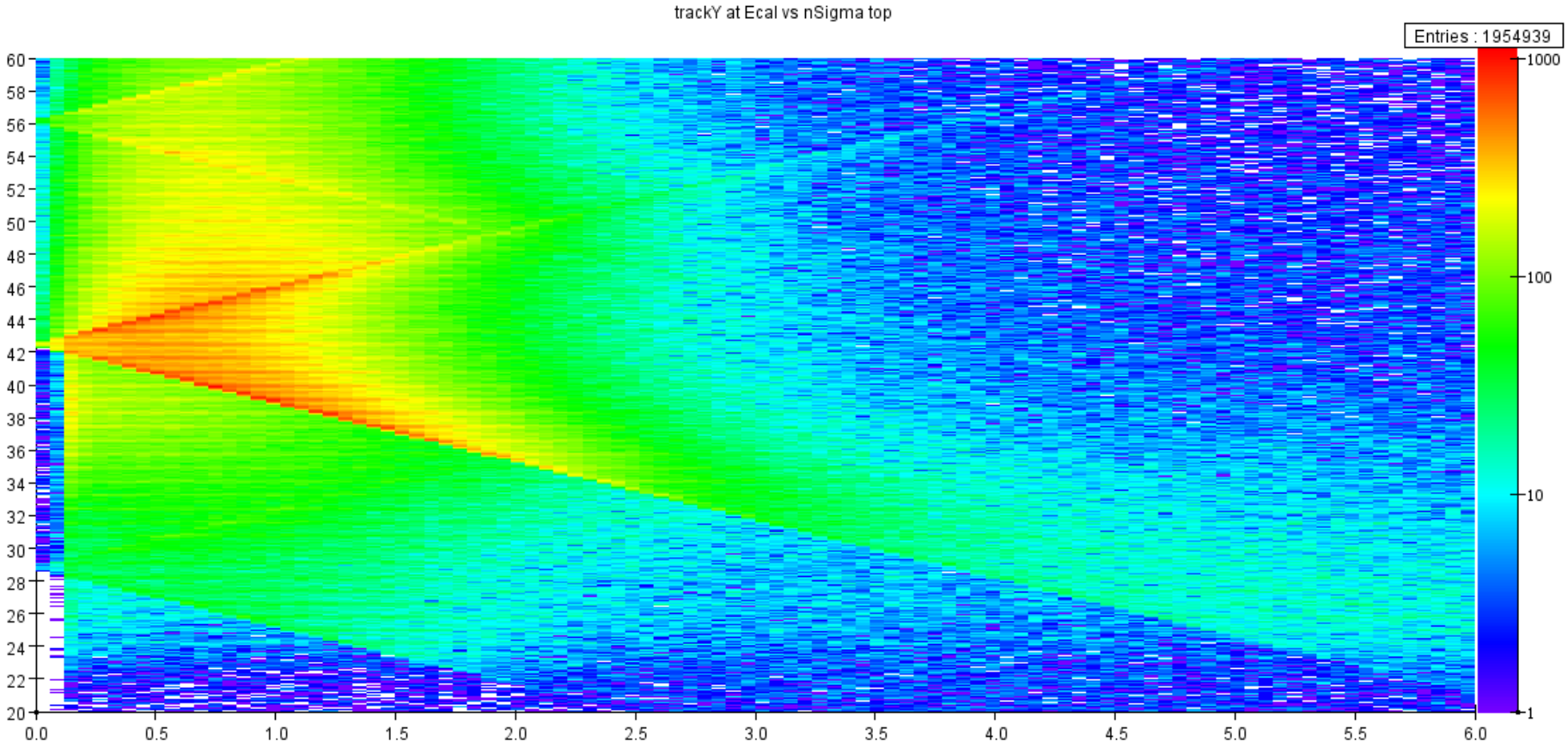




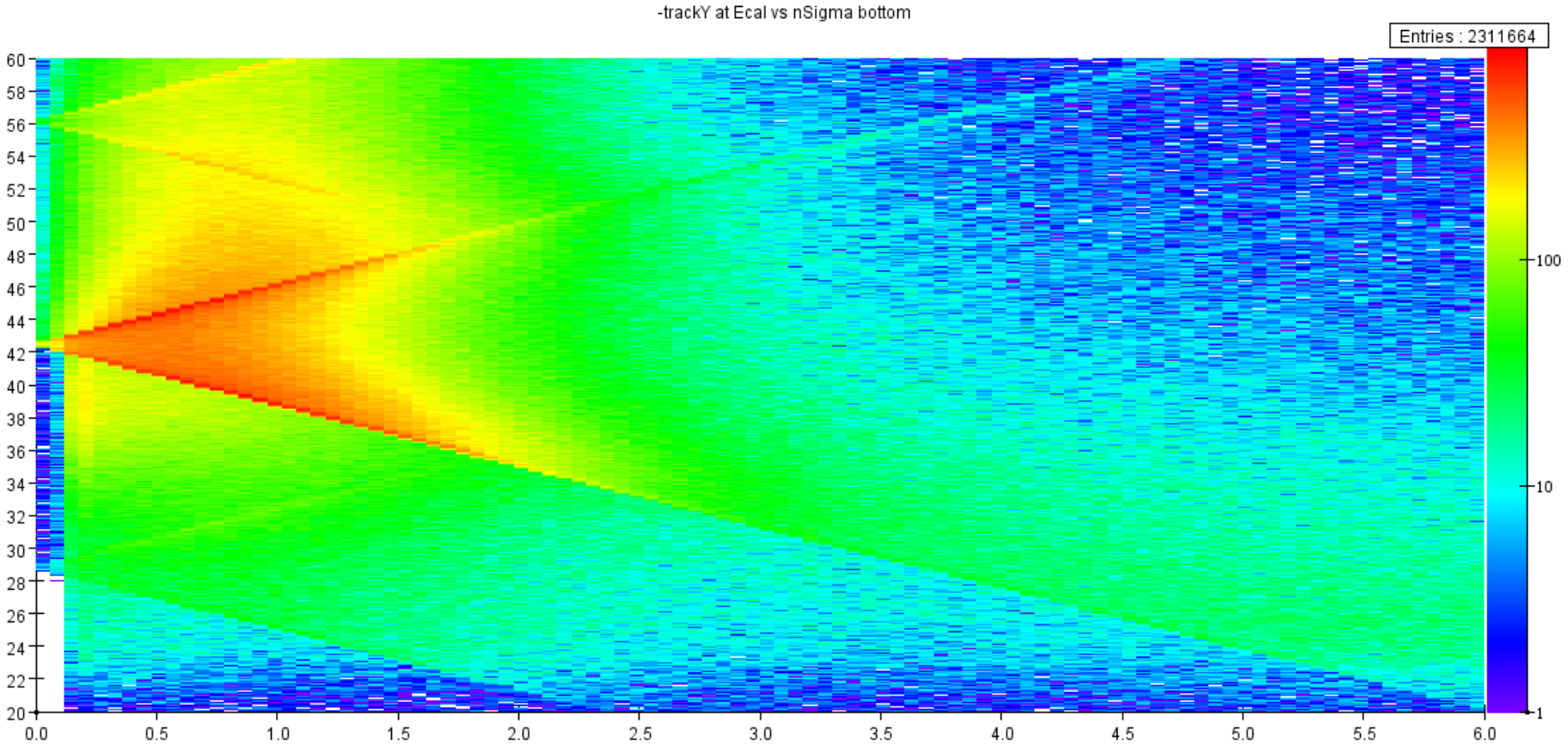
2015 Analysis

- Uses technique pioneered by Nathan, plotting dy vs y close to calorimeter edge.
- Created git issue #269
  - “Calculate Calorimeter y position with respect to the SVT”
- Copy over fee skims from 2015 pass7 for runs 5796 and 5797
- Plot nSigma vs Y
  - nSigma = ReconstructedParticle. getGoodnessOfPID()
  - y =TrackStateUtils.getTrackStateAtECal(t). getReferencePoint()[2]

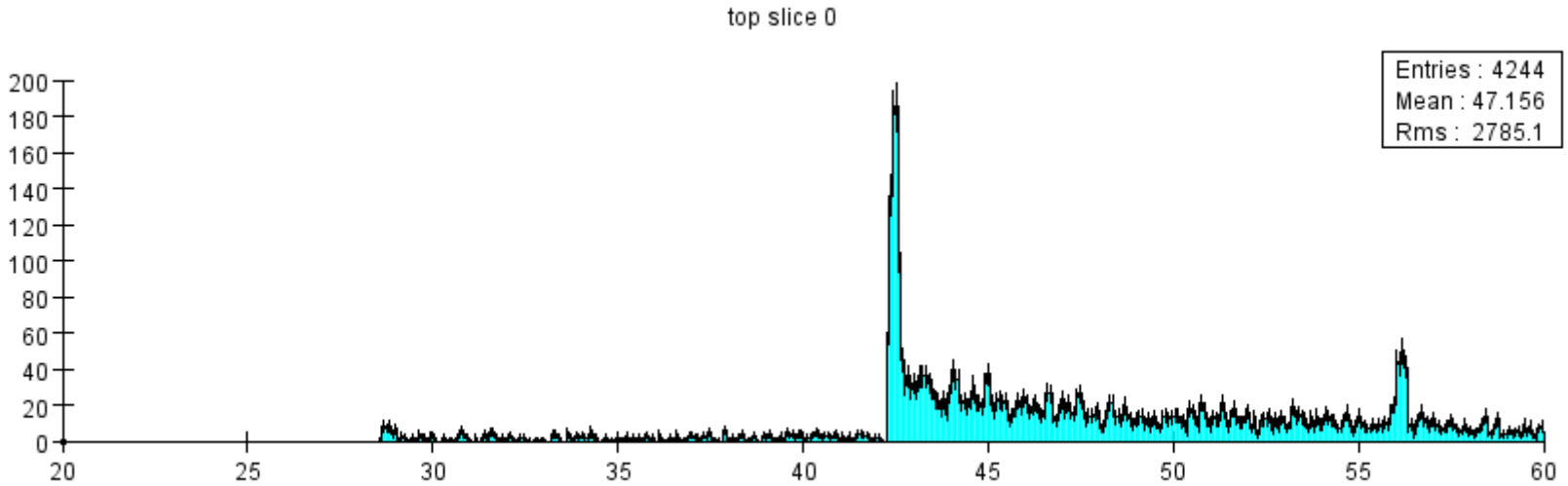
nSigma vs y (top)

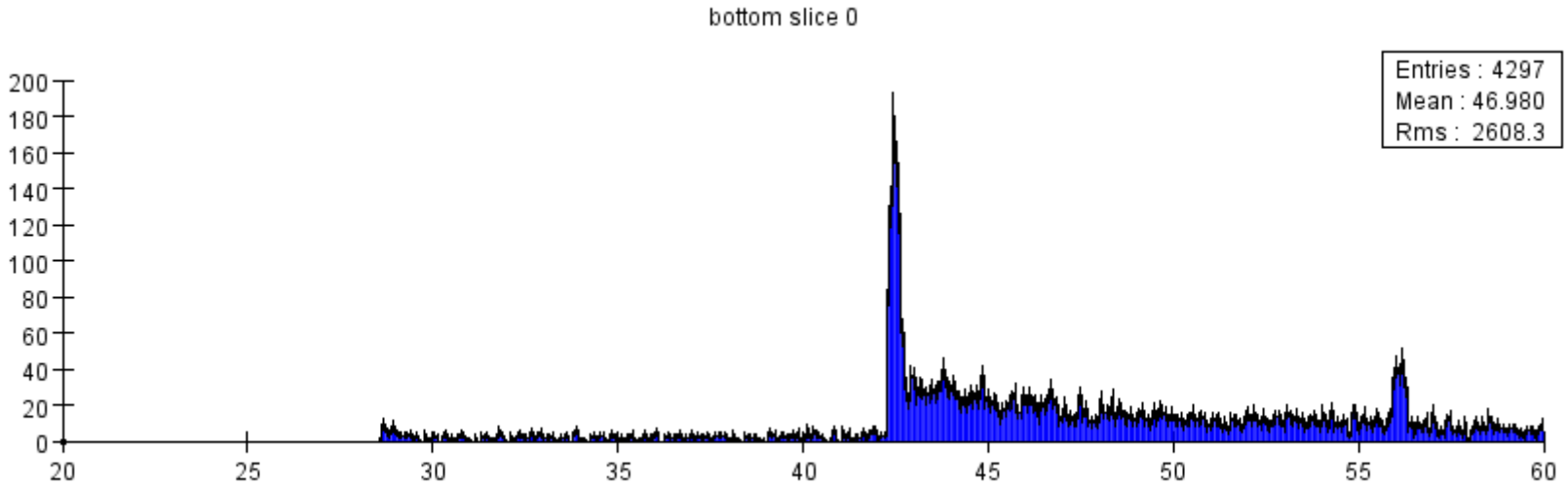


nSigma vs y (bottom)

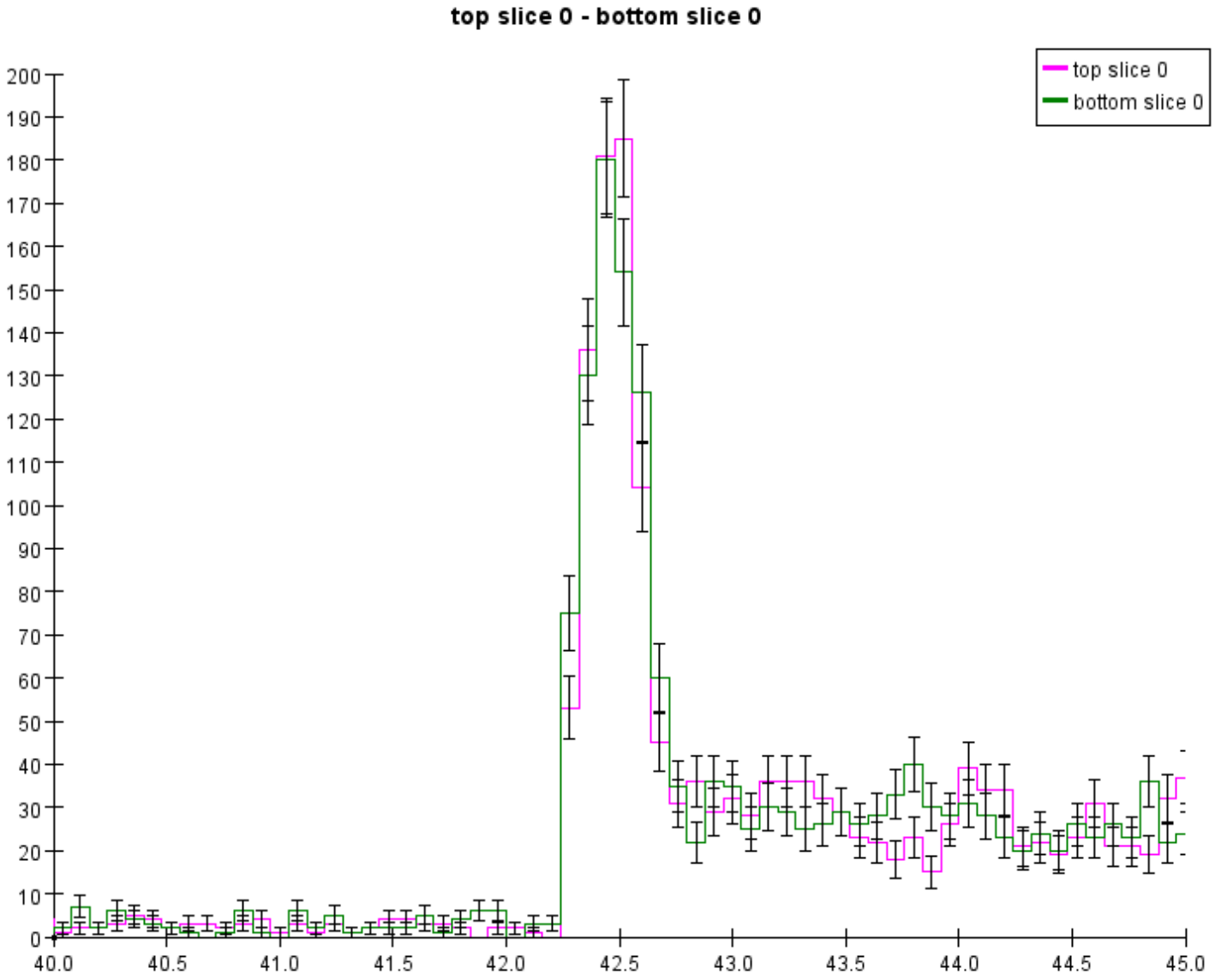


Slice at nSigma=0





Slice at nSigma=0



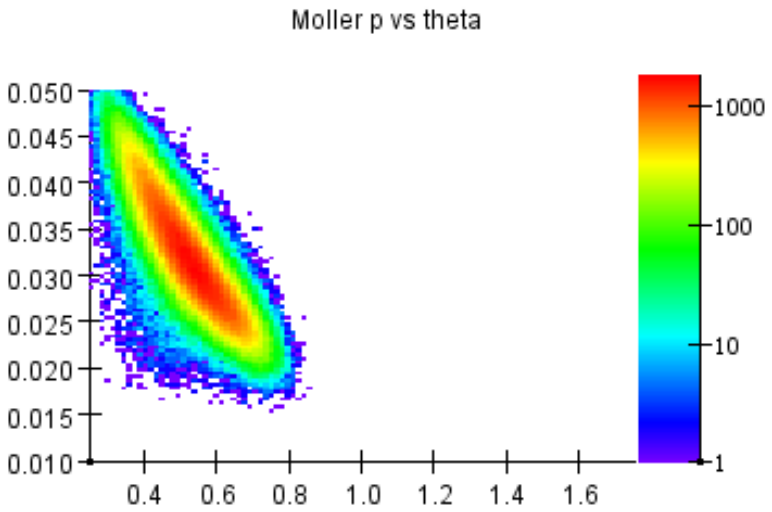
Status

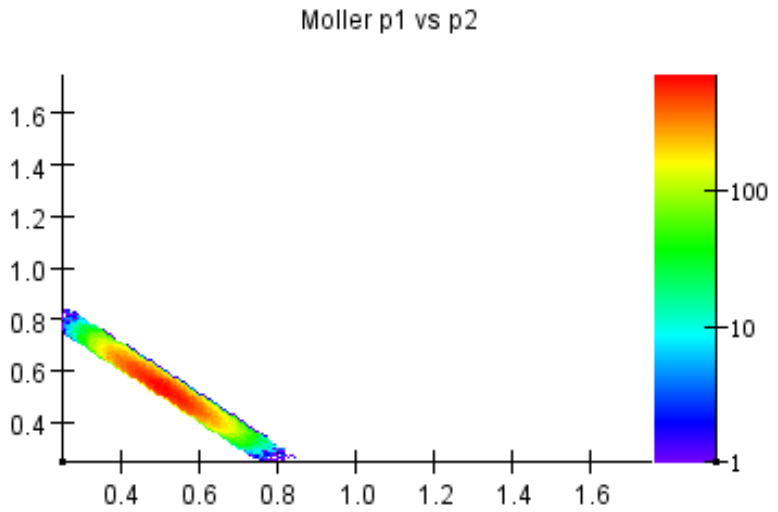
- ECal appears to be remarkable well located with respect to the SVT.
- ECal appears to be symmetrically positioned with respect to y=0.
- Review analysis chain to look for any possible systematic errors
- Redo analysis propagating track state at last sensor to ECal face.
  - Currently using track state @ IP.
- Test/confirm on Monte Carlo samples
- Investigate y as fn(x) to look for rotations

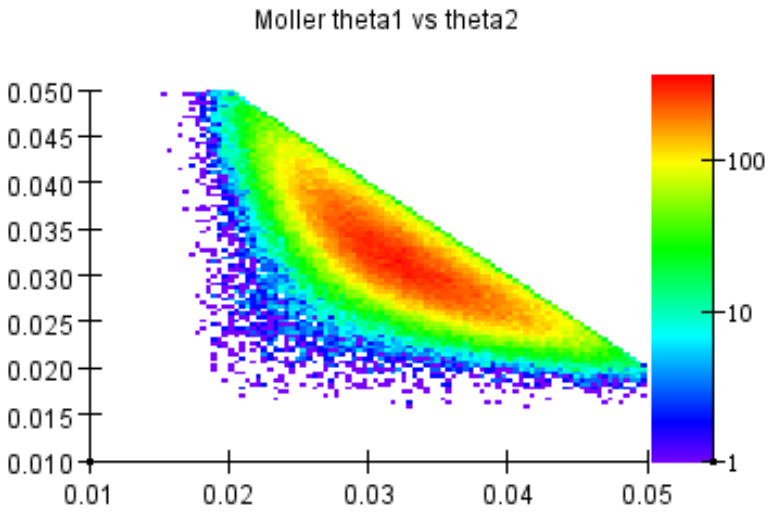
Where's the Beam?

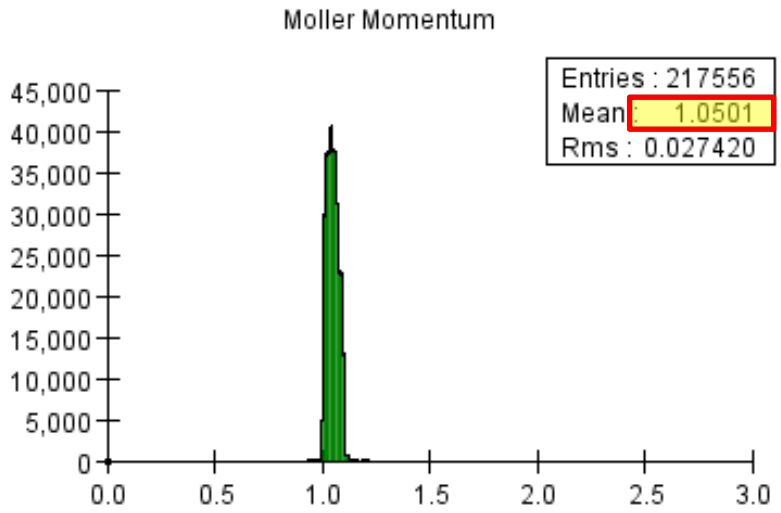
- Ecal and SVT appear to be aligned, but still need to check where the beam is and where the beam is going.
- Use Møller candidate Unconstrained Vertex to determine target position in z and beamspot in (x,y).
- Use Møller candidate Unconstrained Vertex momenta to determine beam direction with respect to the SVT.

2015 pass7 Møller Kinematics

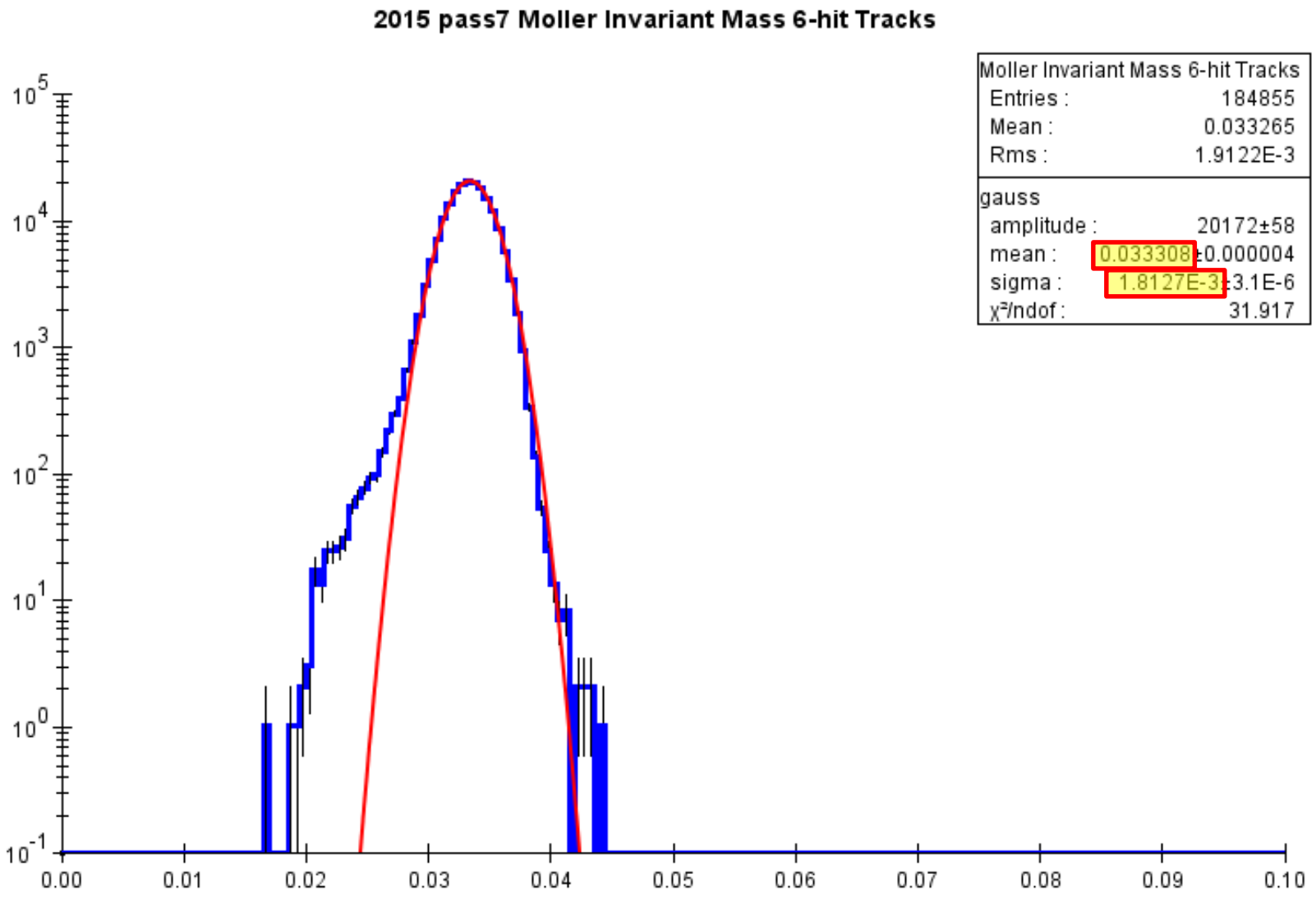




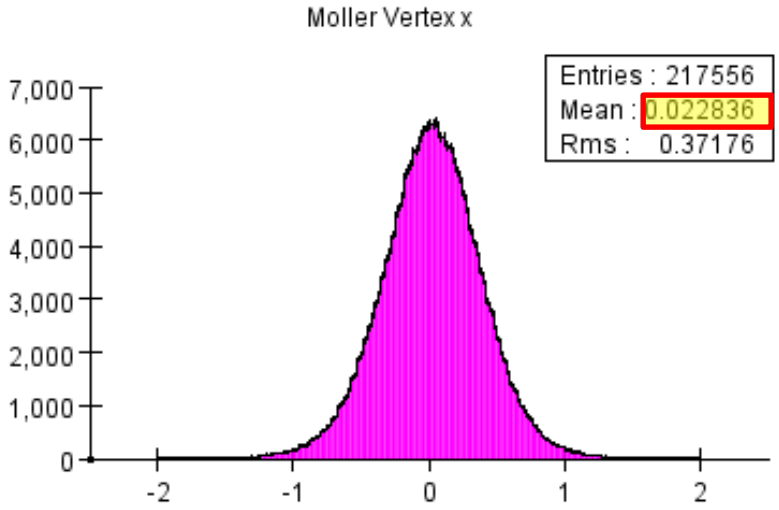


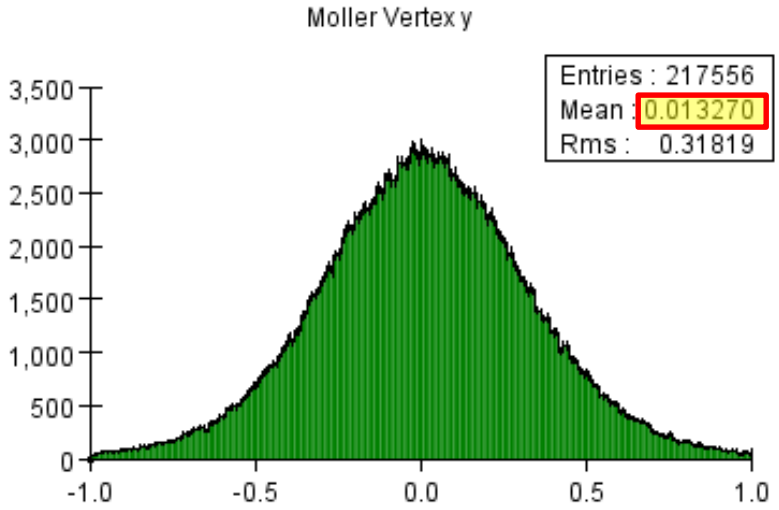


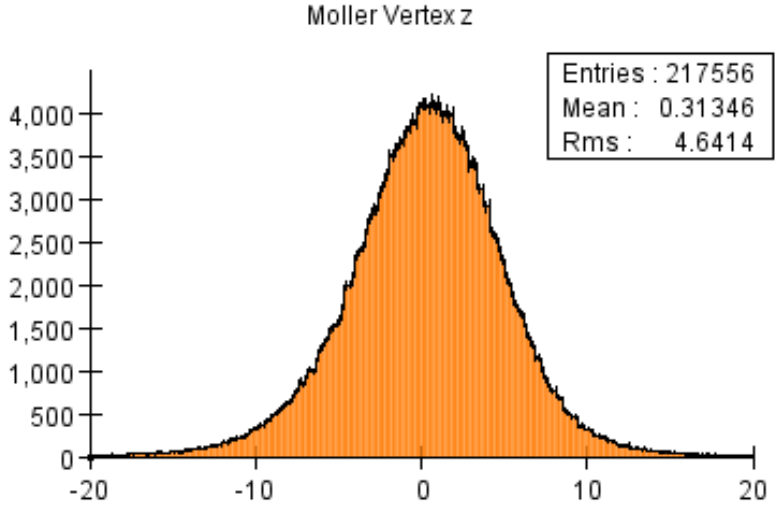
2015 pass7 Møller Invariant Mass

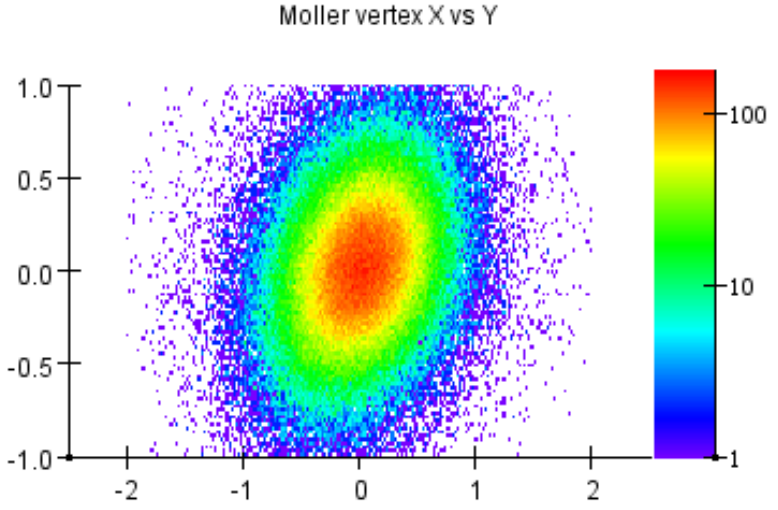


2015 pass7 Møller Vertex

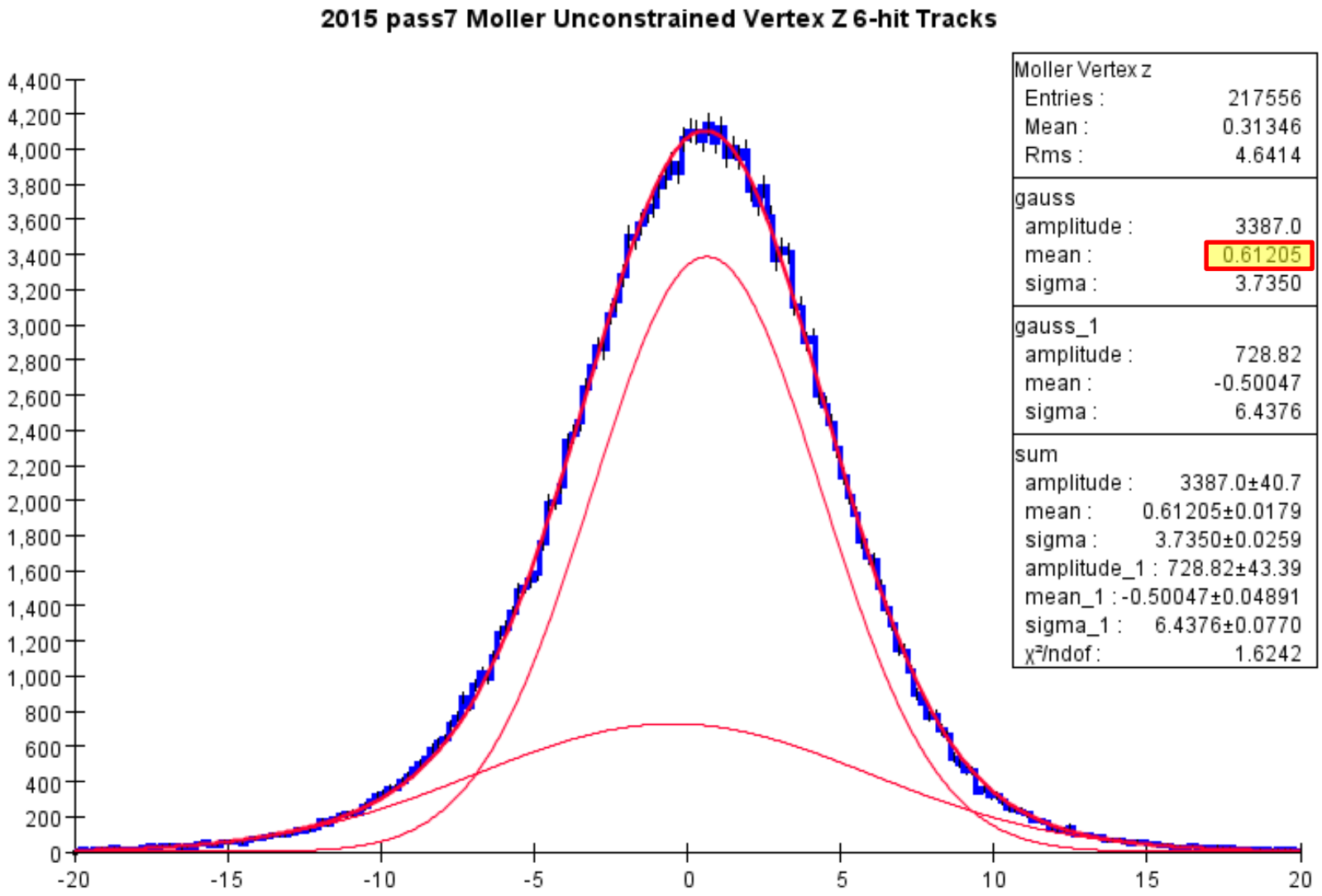




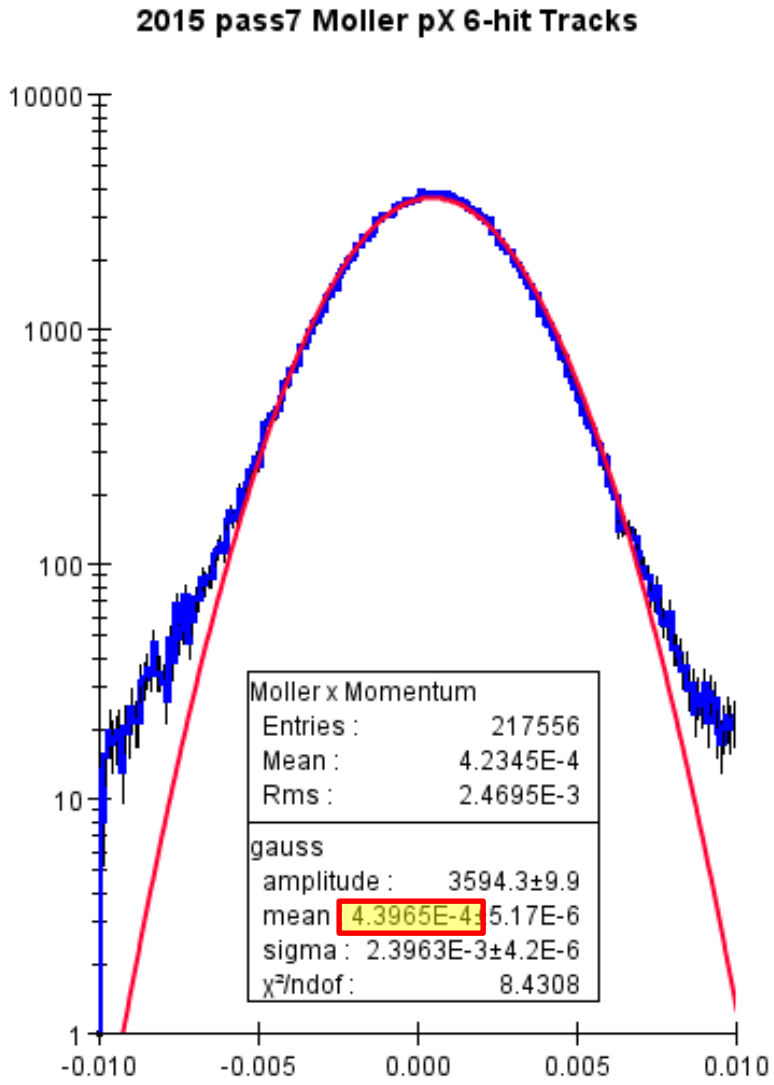


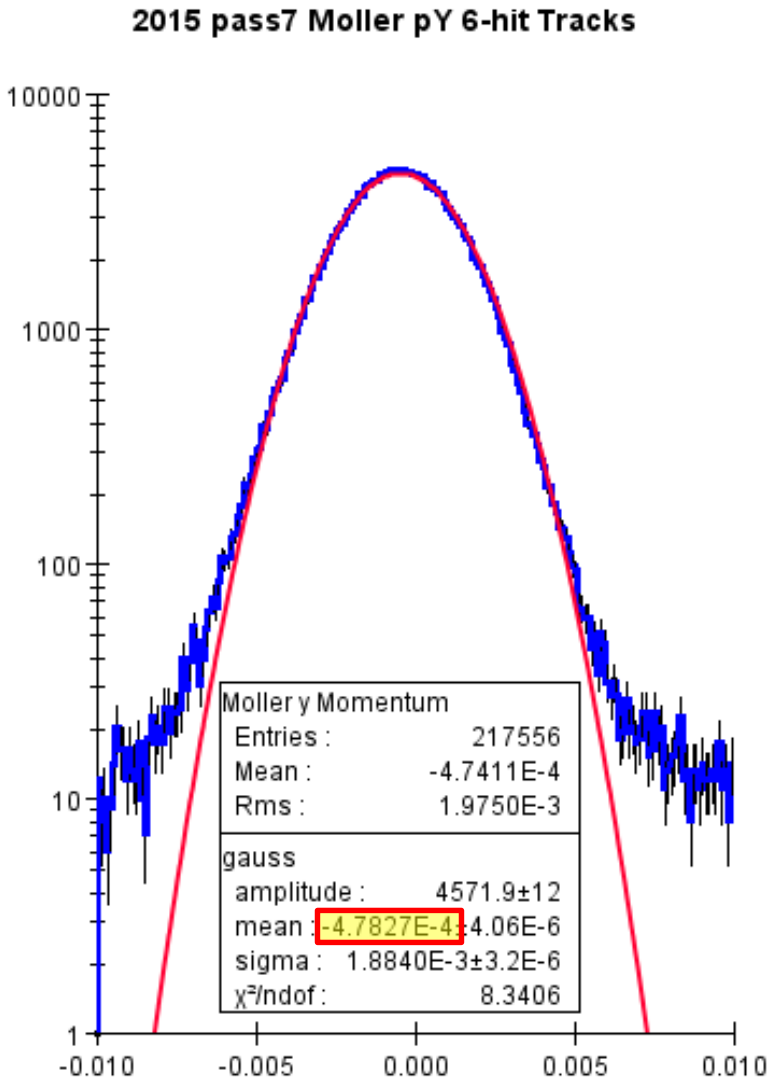


2015 pass7 Møller Vertex Z



2015 pass7 Møller Momentum





Beam Alignment

- Target z position (6mm) is consistent with that being used for the target-constrained fit in pass7 (5mm)
- Beamspot at target (0.02, 0.01) is consistent with (0,0)
- Beam momentum (4.4E-4, -4.7E-4, 1.050) is consistent with the z axis