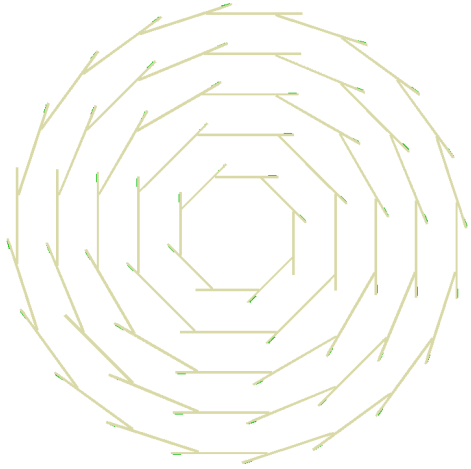
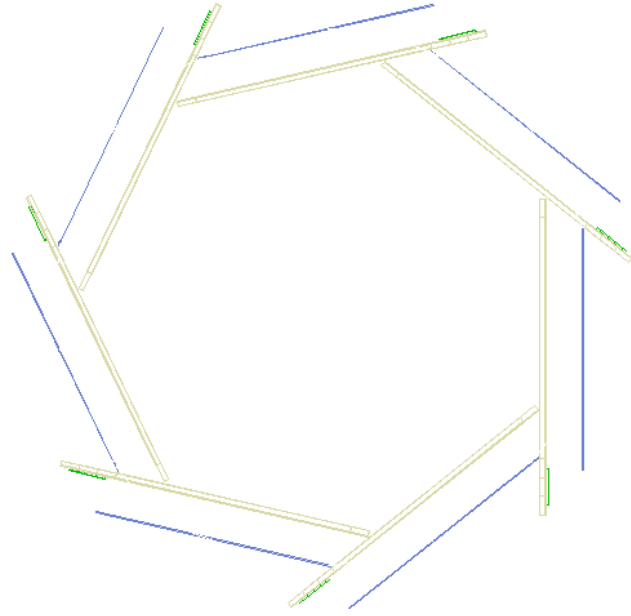
Study on the Impact Parameter Resolution of DEPFET VXD

Xun Chen

Standard setup vs. Test setup





Standard setup

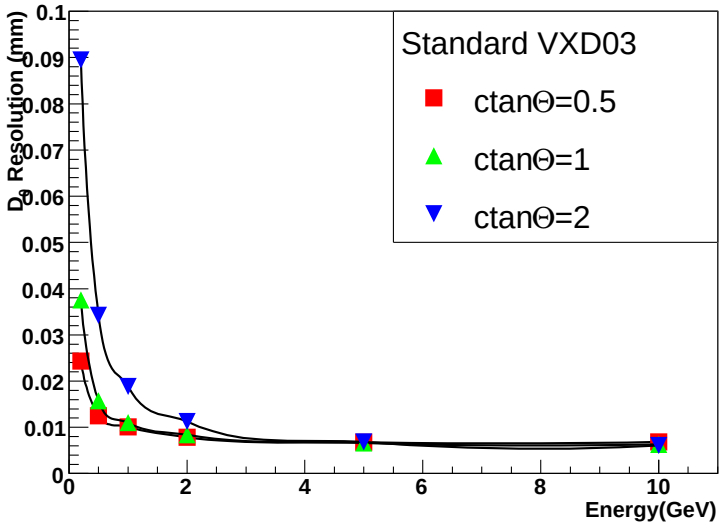
	radius	ladders	length	ladder gap
1	15.5	8	100	0

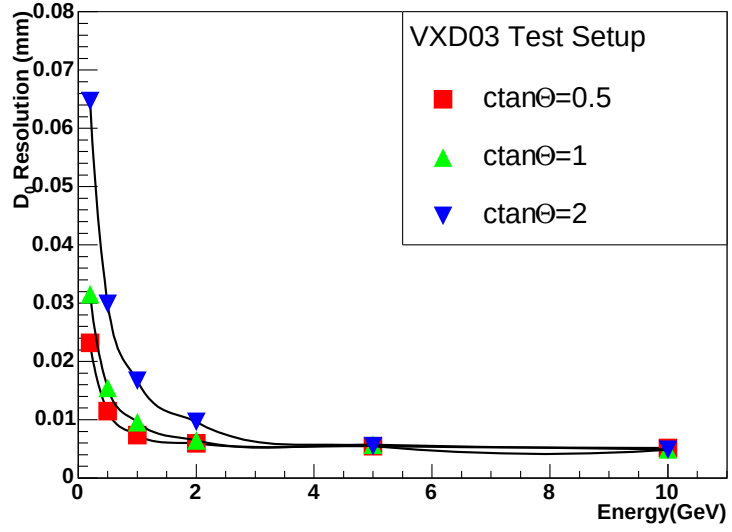
Test setup

	radius	ladders	length	ladder gap
1	12	7	100	0
a	14	7	100	0

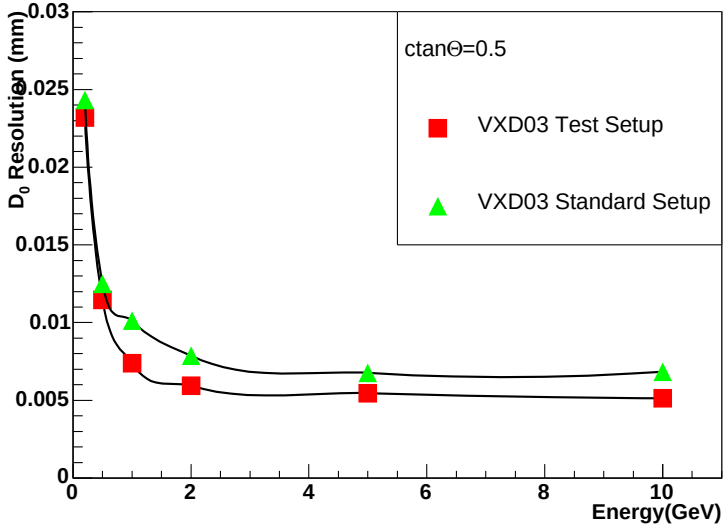
- Simulate the vertex detector only.
- Mokka runs in standard mode and test mode.
- Generate samples of single particles with predefined energy and polar angle.
  – μ^+, Energy = 0.2, 0.5, 1, 2, 5, 10GeV, $\cot\Theta = 0.5, 1, 2$.
- Vertex digitization by Marlin Processor VTXDigitizer.
- Vertex Tracking by Marlin Processor VertexTracking.
- Analysis the impact resolution as the function of energy and Θ.

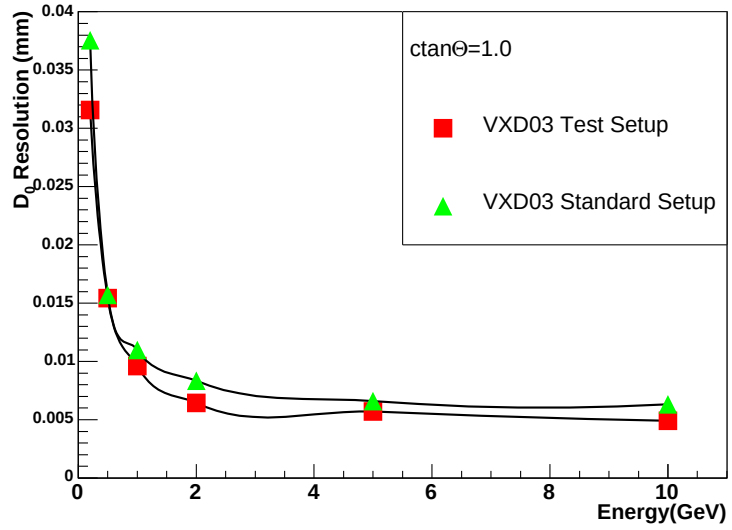
D_0 resolution(1)

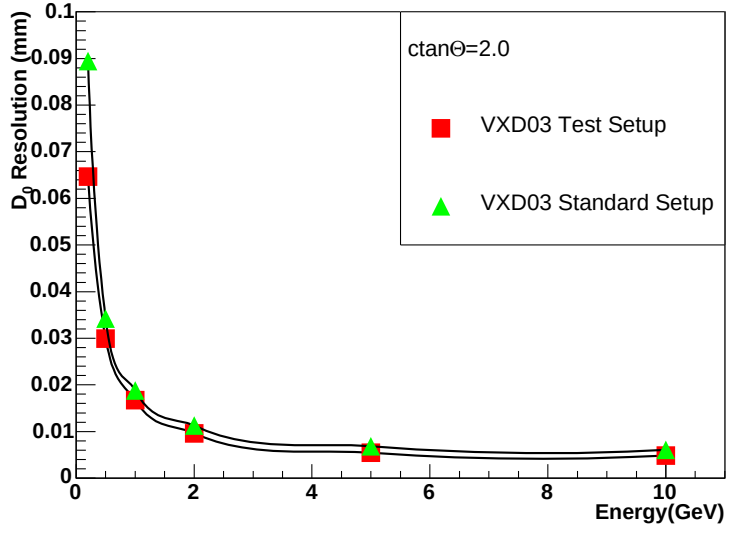




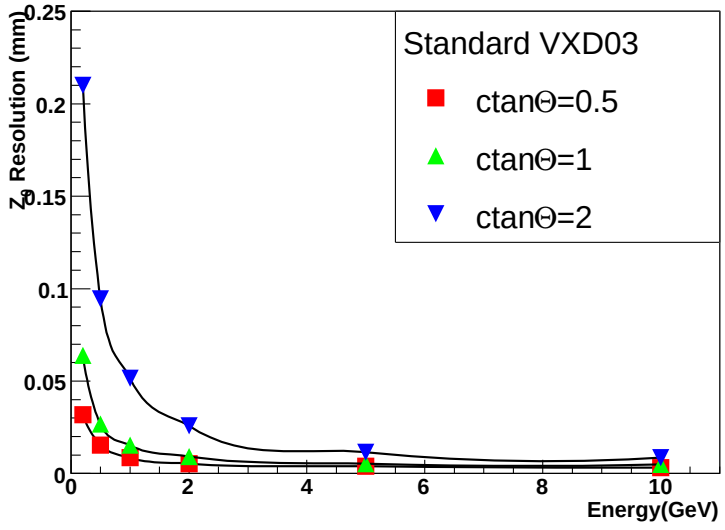
D_0 resolution(2)

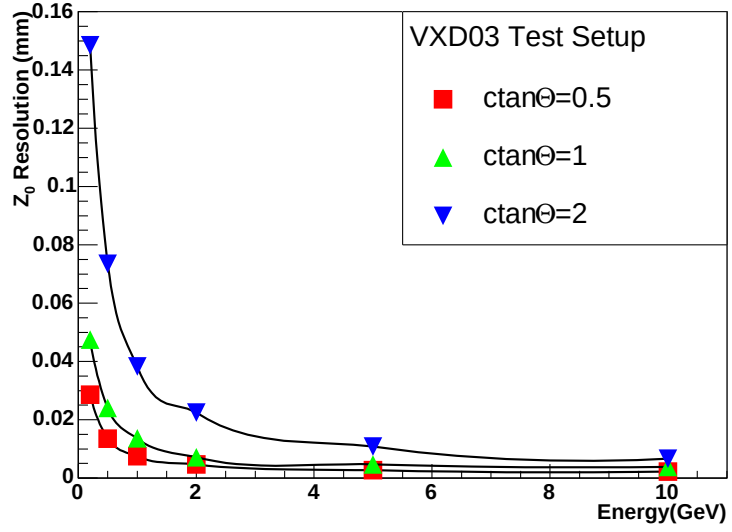




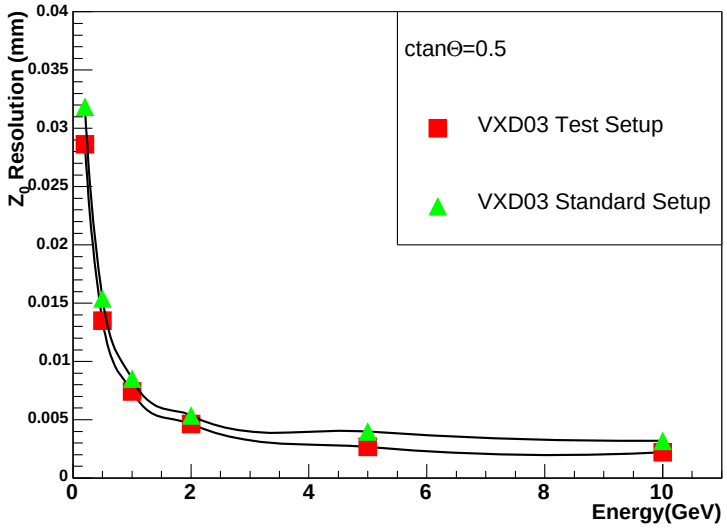


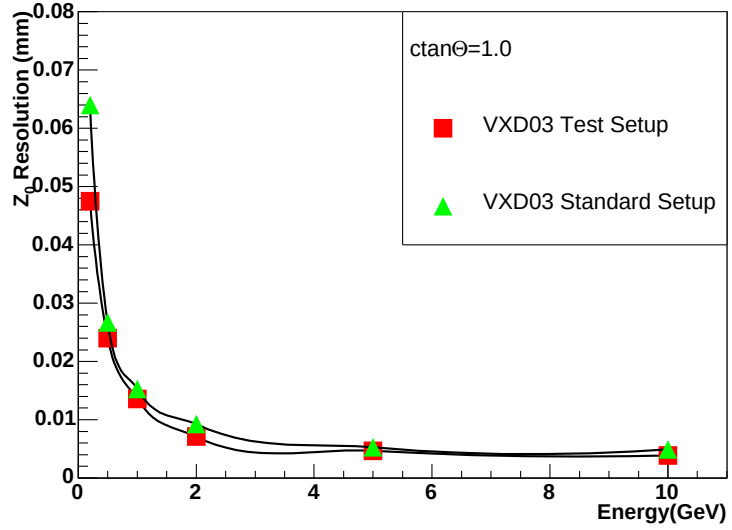
Z_0 resolution(1)

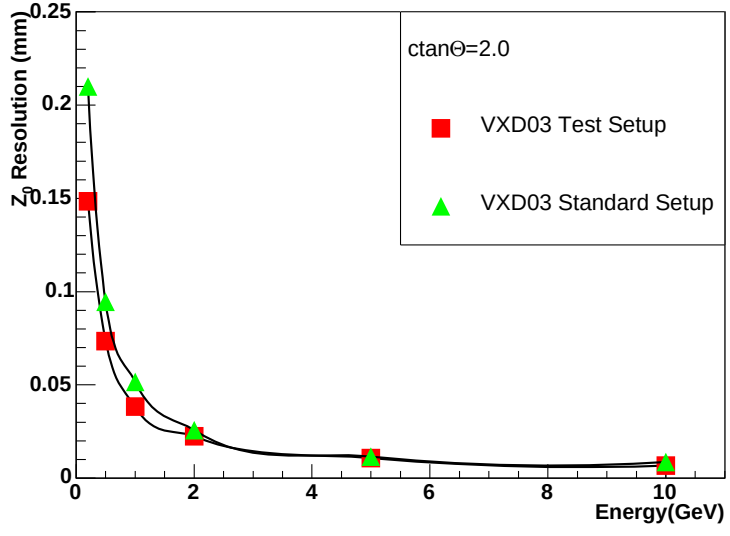




Z_0 resolution(2)



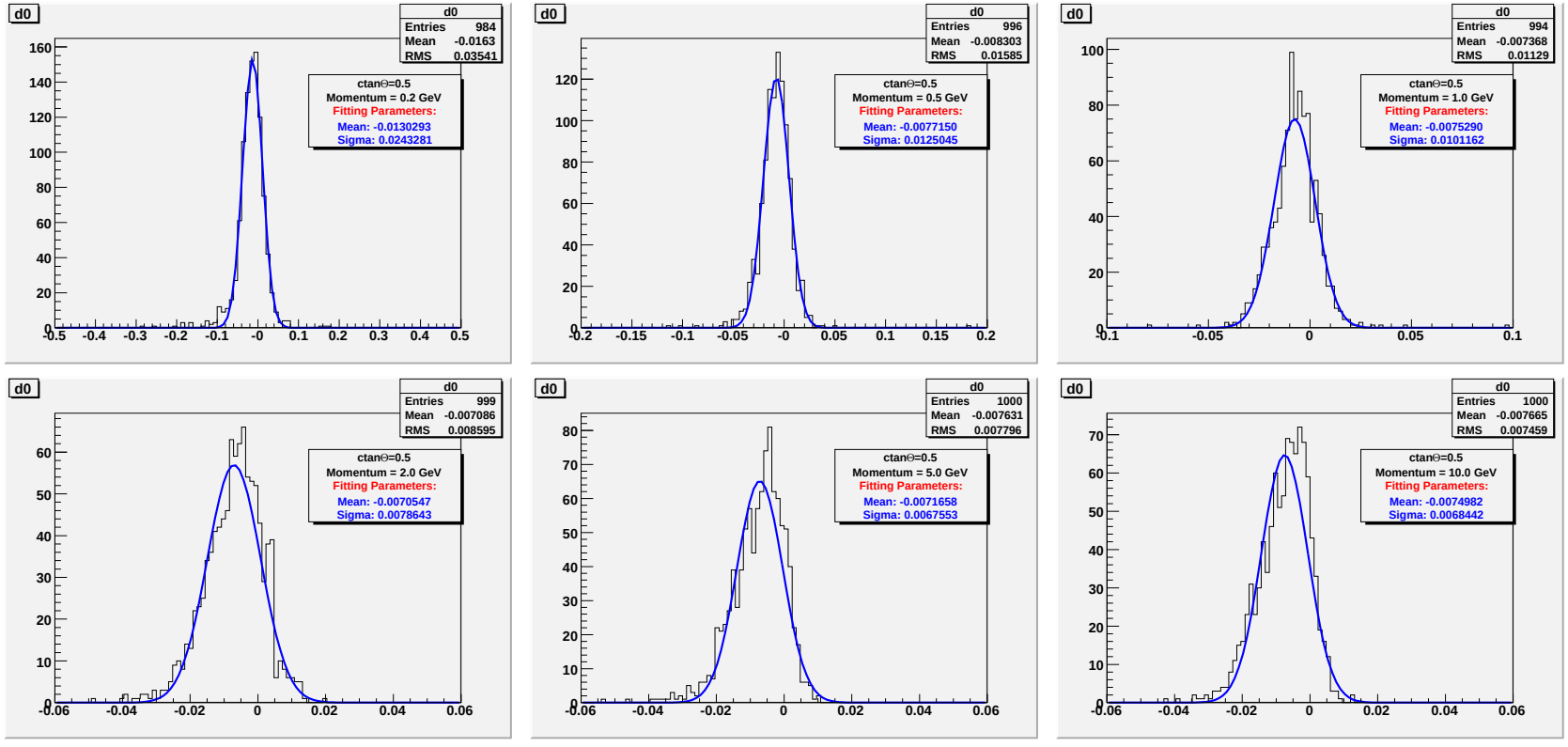




Summary

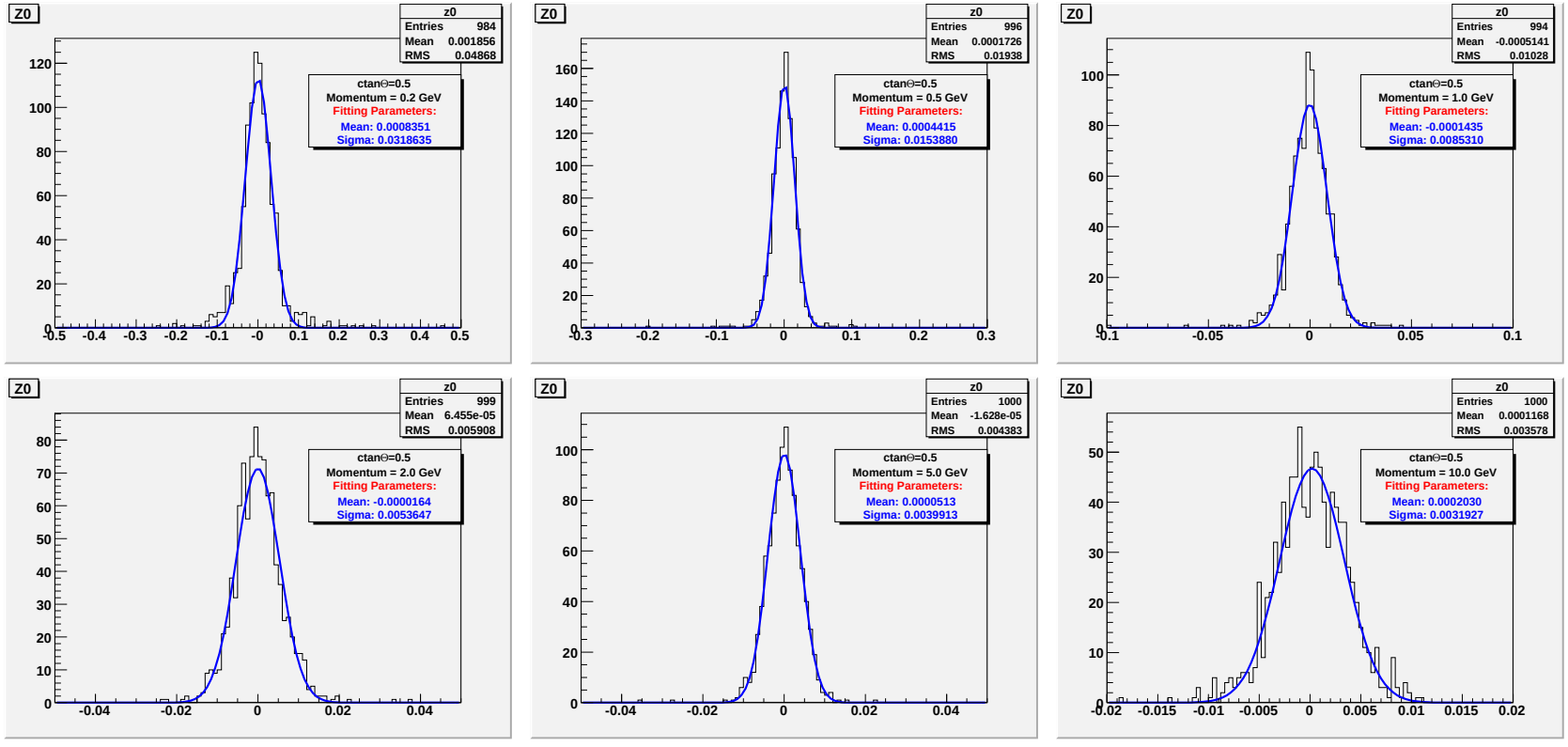
- The impact parameter resolution of test setup is better than that of standard setup.
- The increasing of resolution is large when the momentum of the sample particle is small, especially at the situation when the polar angle is small.

backup slides(1)



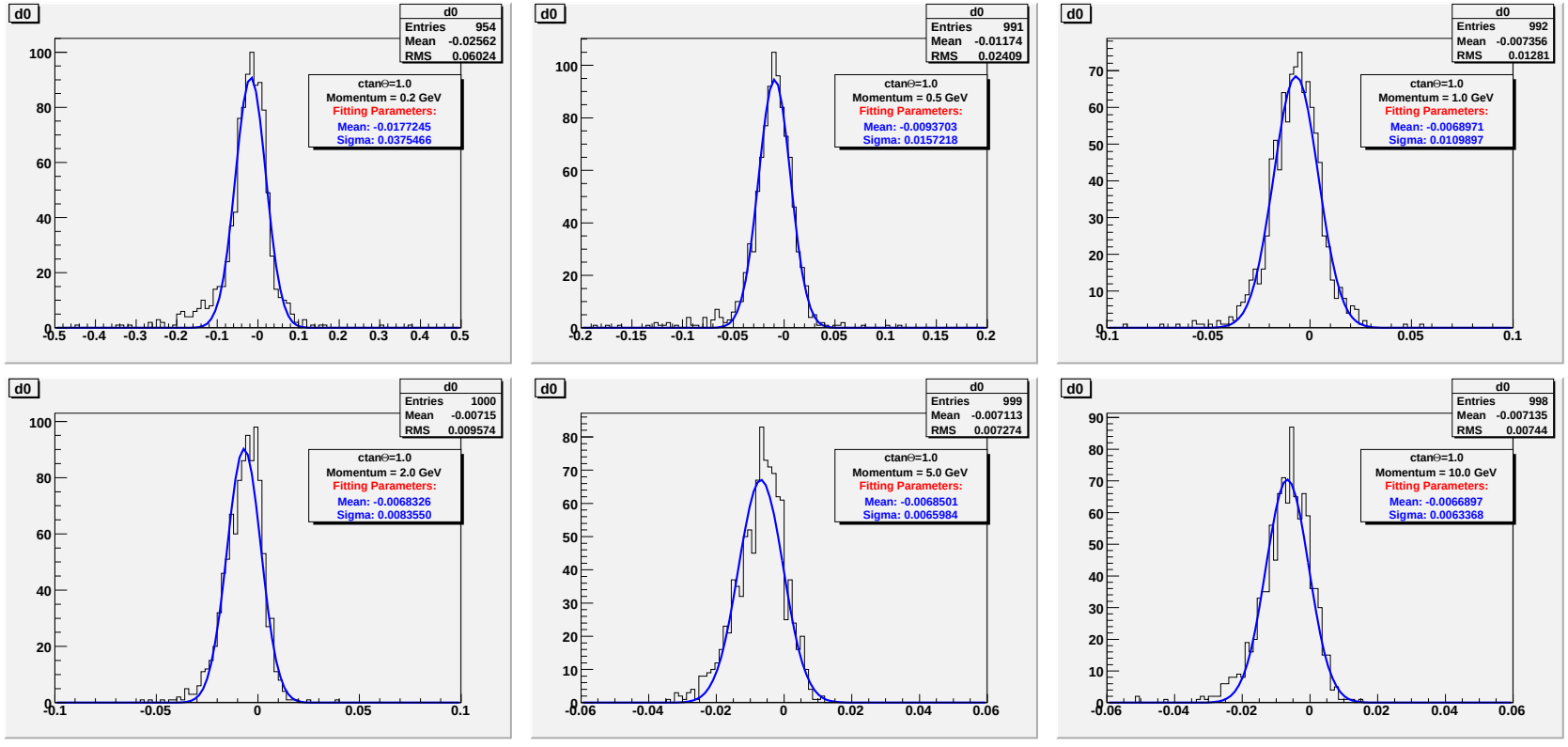
D_0 distribution of Standard setup at $\cot\Theta = 0.5$.

backup slides(2)



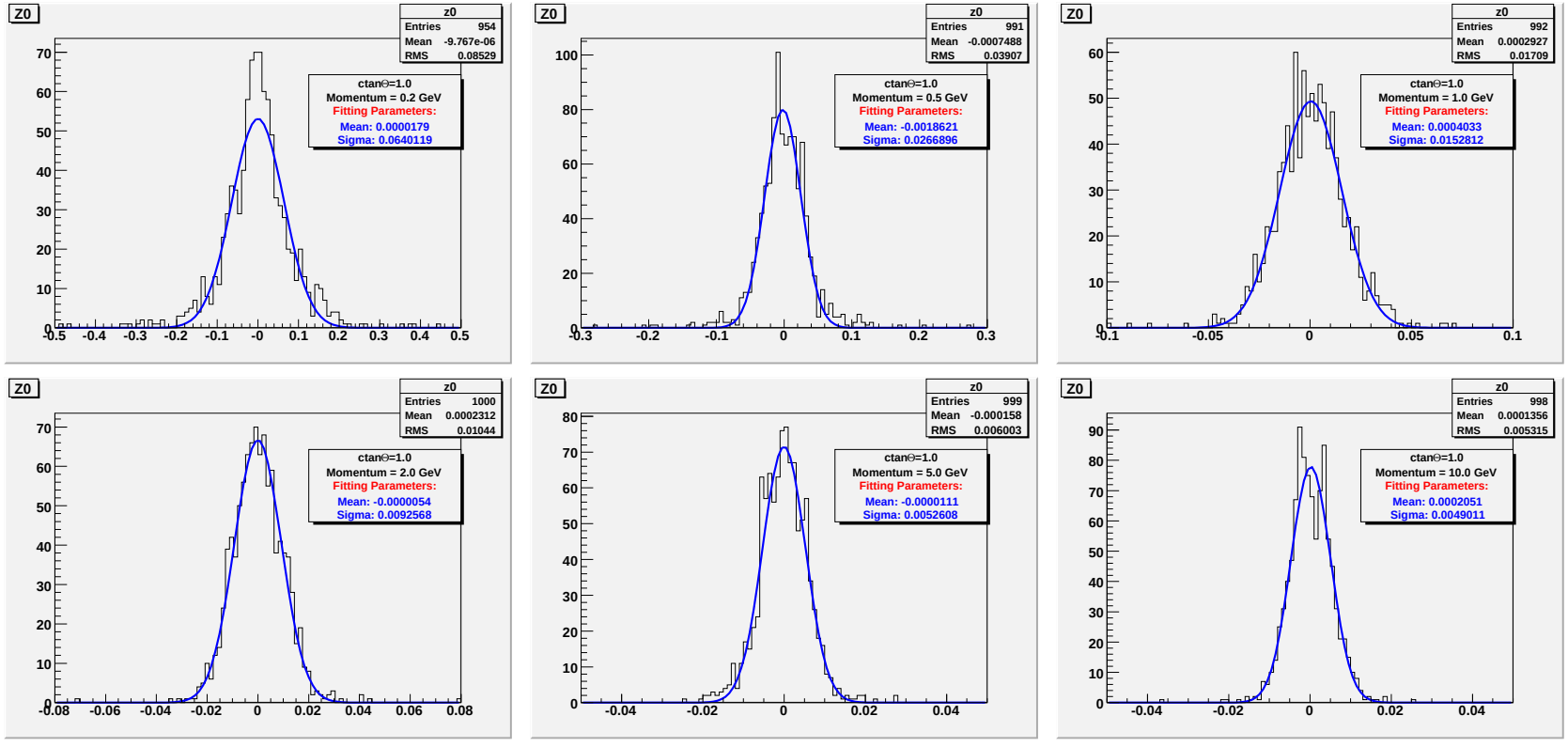
Z_0 distribution of Standard setup at $\cot\Theta = 0.5$.

backup slides(3)



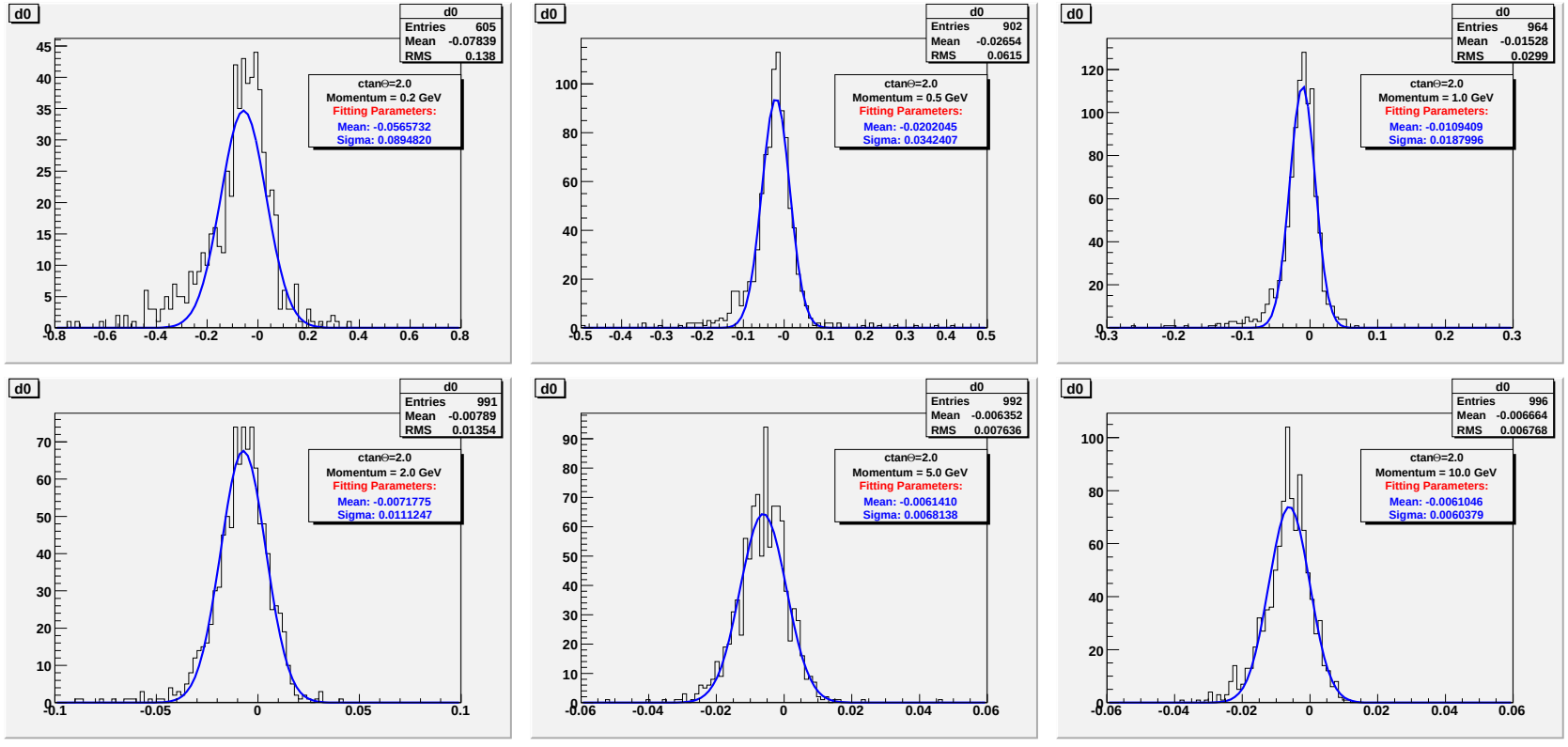
D_0 distribution of Standard setup at $\cot\Theta = 1.0$.

backup slides(4)



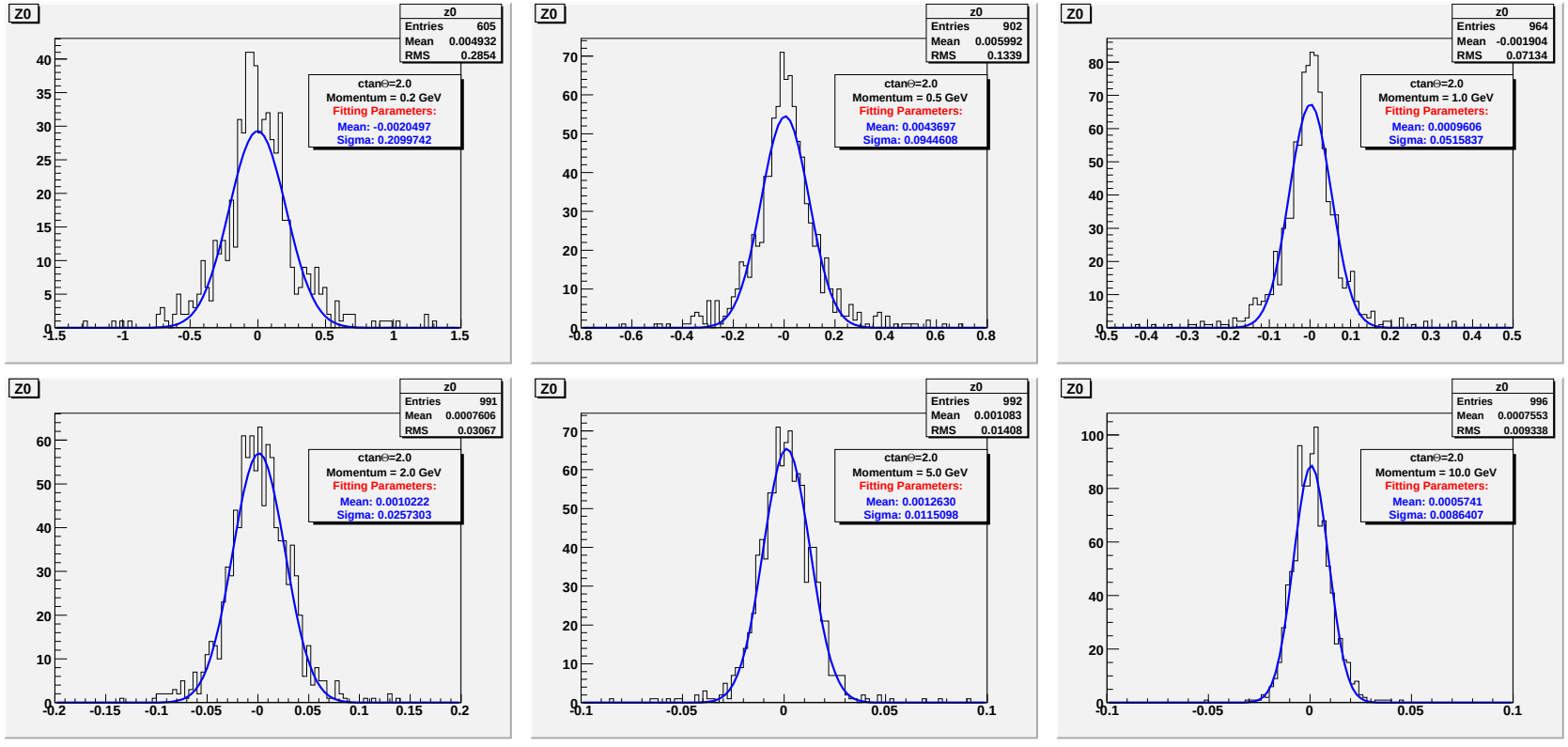
Z_0 distribution of Standard setup at $\cot\Theta = 1.0$.

backup slides(5)



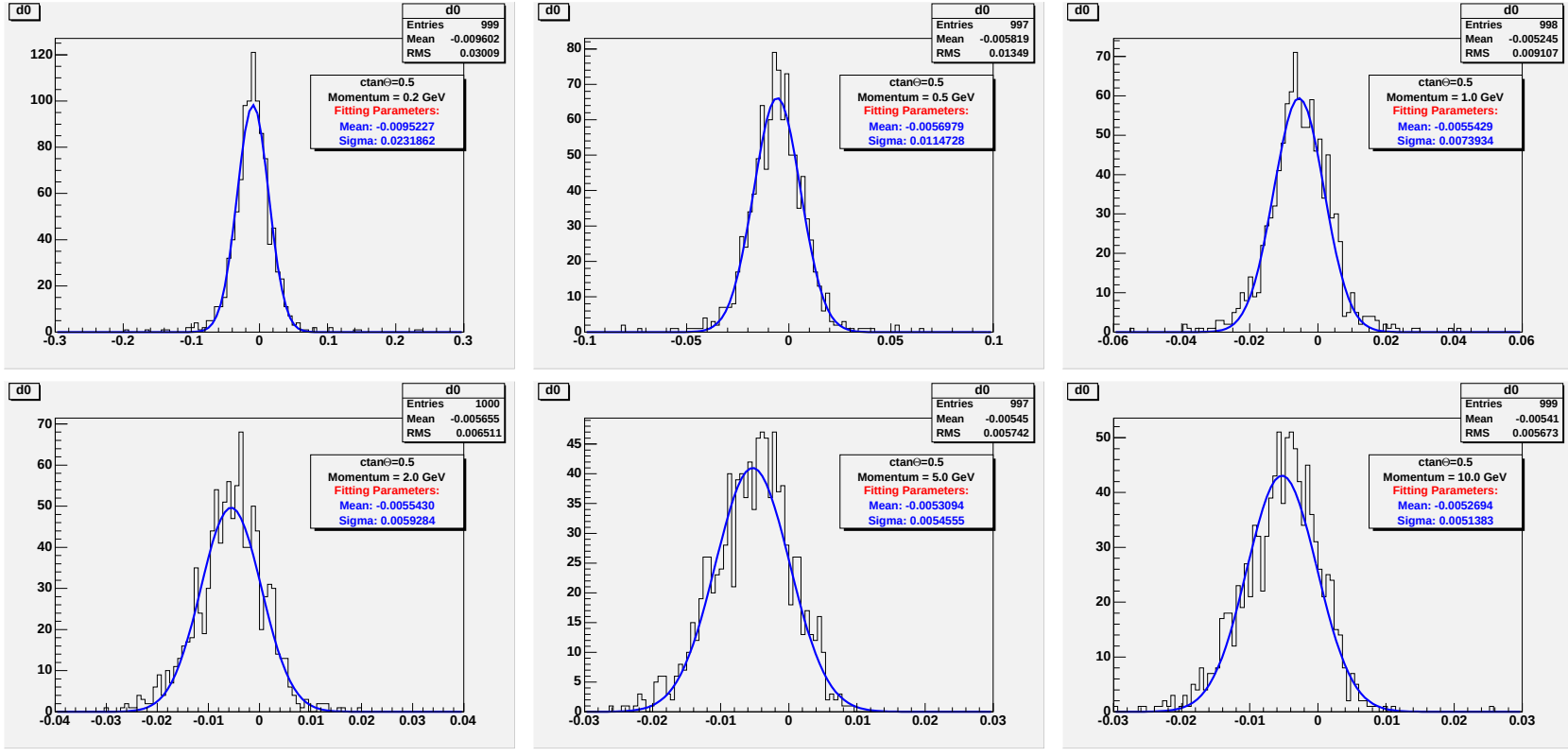
D_0 distribution of Standard setup at $\cot\Theta = 2.0$.

backup slides(6)



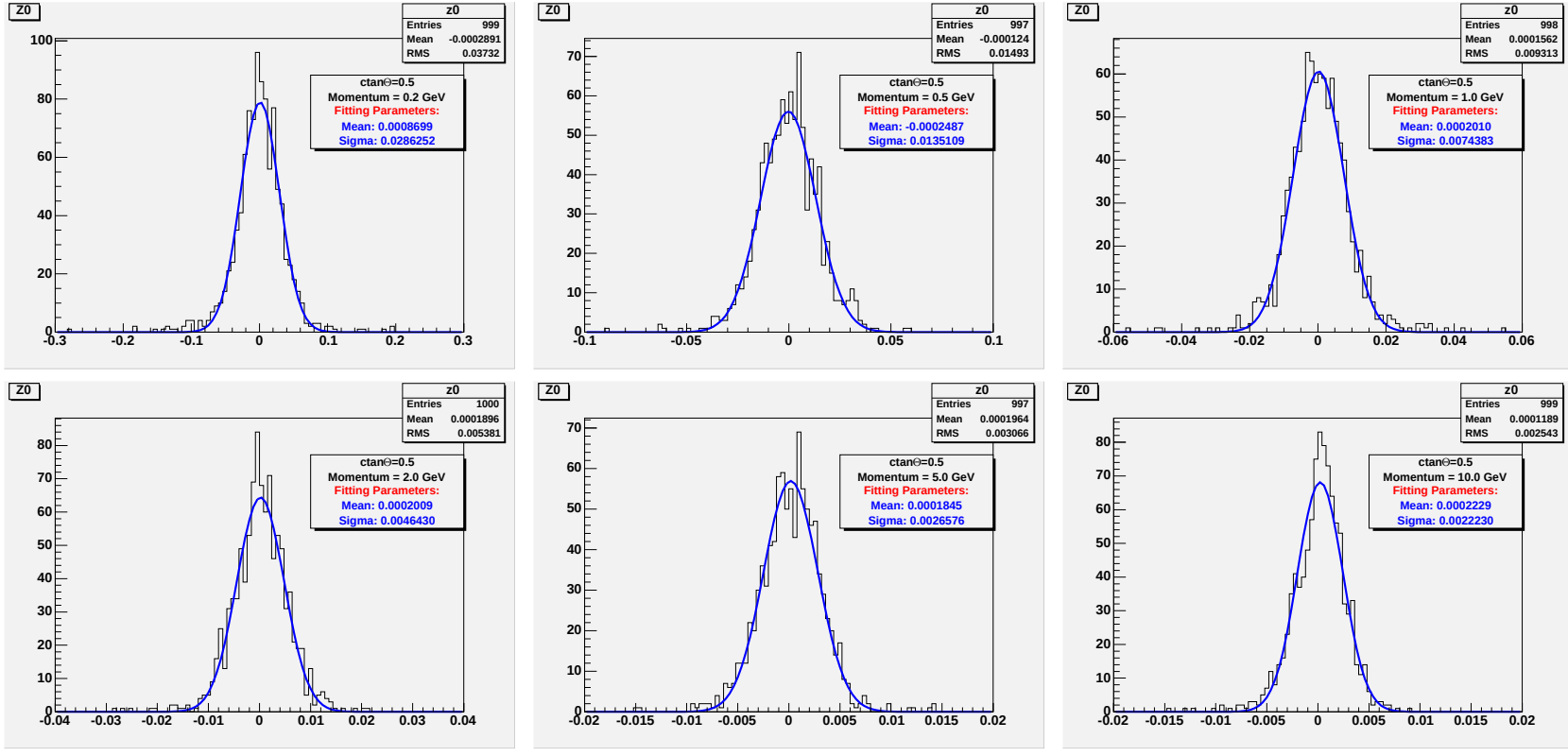
Z_0 distribution of Standard setup at $\cot\Theta = 2.0$.

backup slides(7)



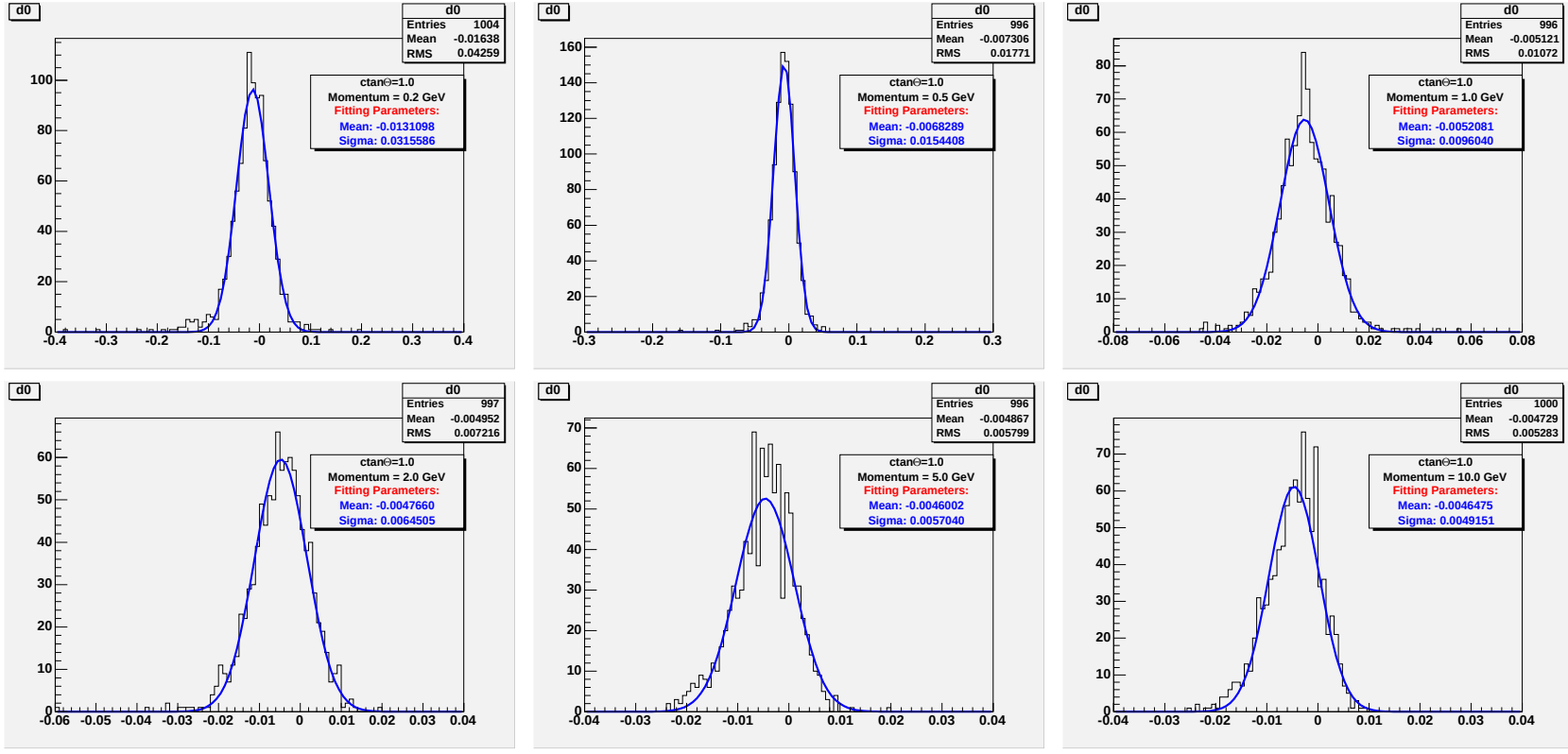
D_0 distribution of Test setup at $\cot\Theta = 0.5$.

backup slides(8)



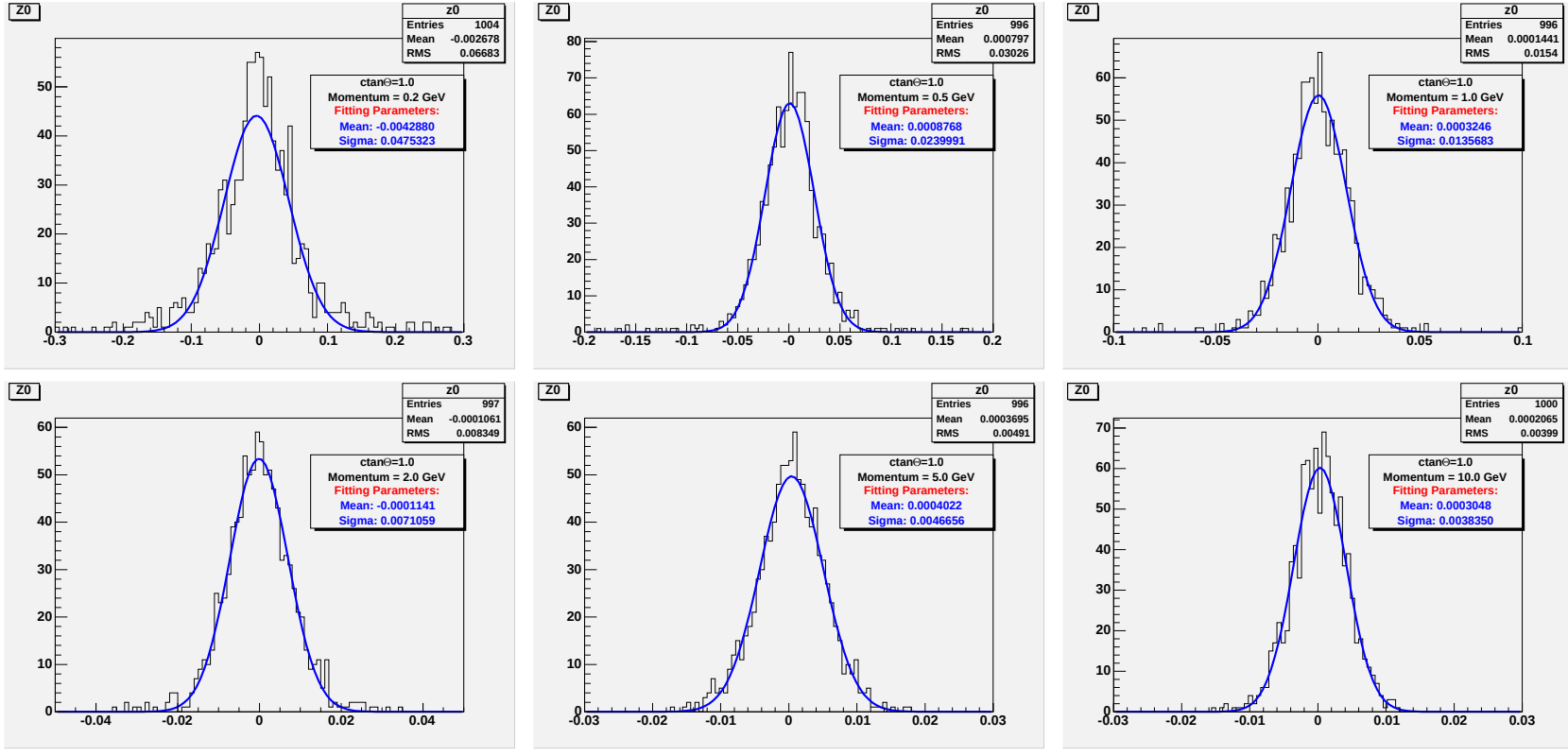
Z_0 distribution of Test setup at $\cot\Theta = 0.5$.

backup slides(9)



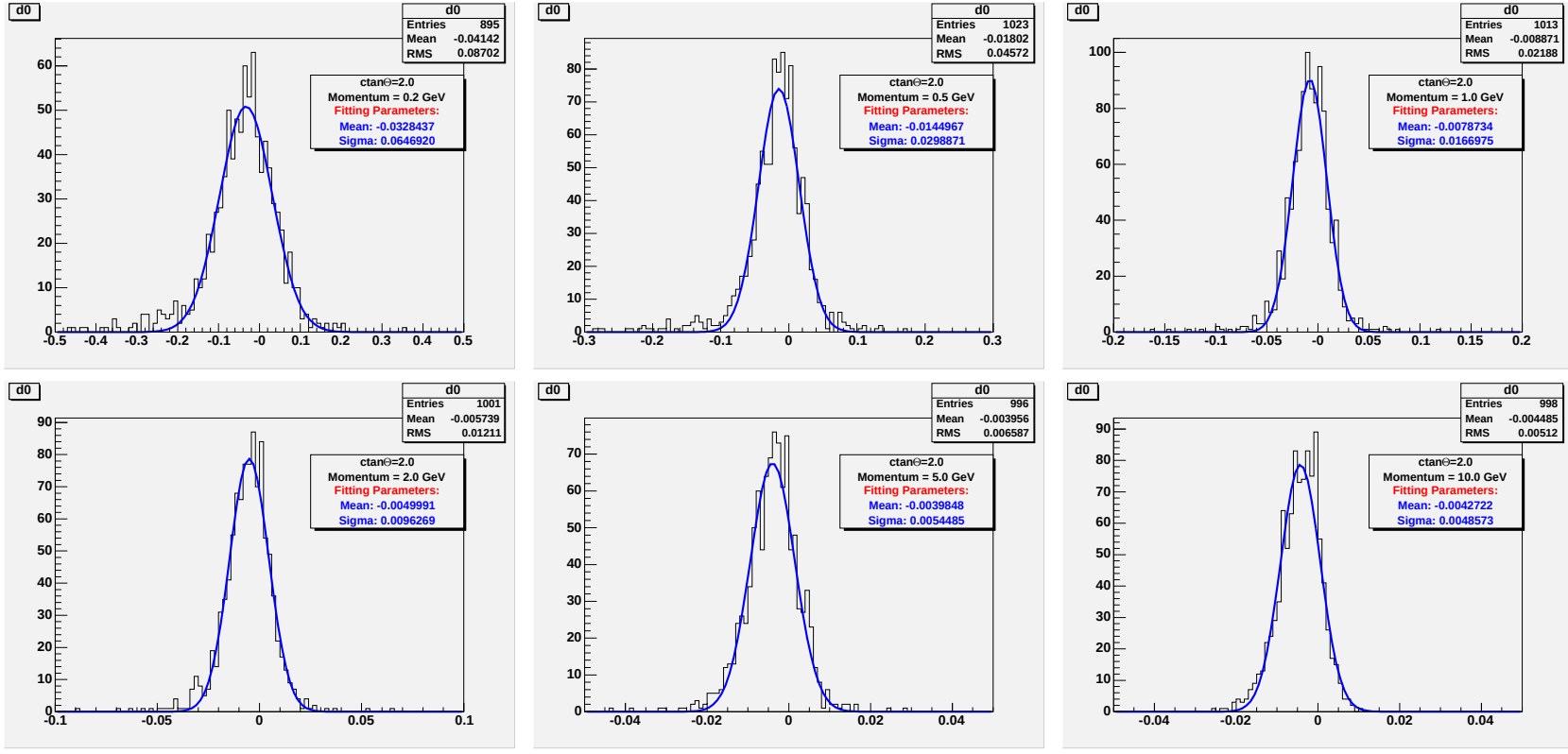
D_0 distribution of Test setup at $\cot\Theta = 1.0$.

backup slides(10)



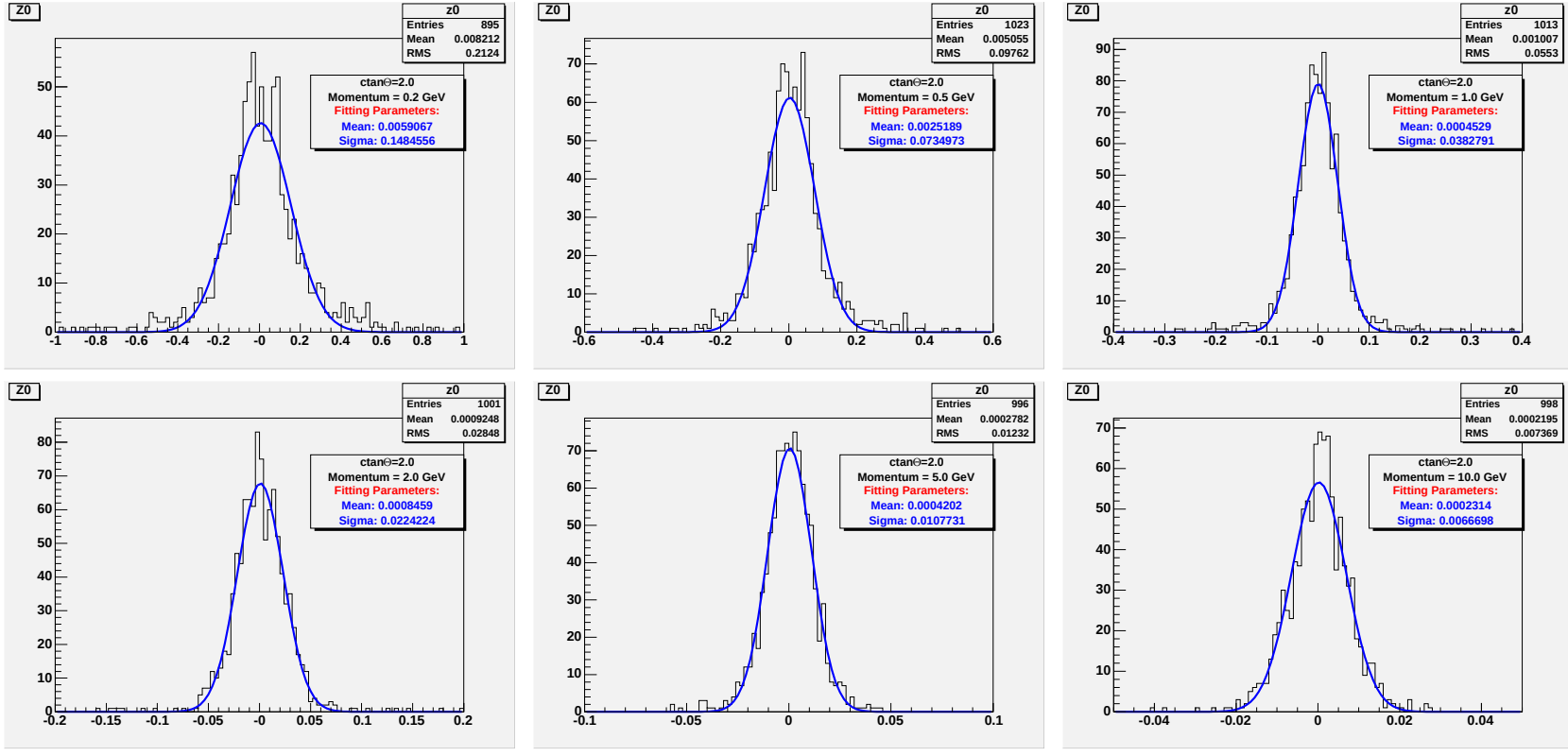
Z_0 distribution of Test setup at $\cot\Theta = 1.0$.

backup slides(11)



D_0 distribution of Test setup at $\cot\Theta = 2.0$.

backup slides(12)



Z_0 distribution of Test setup at $\cot\Theta = 2.0$.