



Quick test of Multiple Scattering

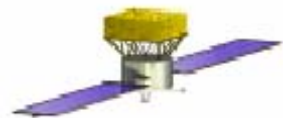
Johann Cohen-Tanugi, Francesco Longo

- " Recent switch to Geant 4 3.2 -> 5.0
- " "Test suite" needed
- " Pre -CDR request: see <http://www-glast.stanford.edu/protected/mail/ana/0024.html>
- " This is preliminary: more to come...



Setup for the study

- Script in `userAlg` uses MC information in TDS to retrieve deflection angle between initial and final direction of an **normally** incident charged track.
- Converting Volume is a **Tungstene** Slab:
thin (0.105 mm) and **thick** (0.723mm)
- Projected angle is computed as: $\arcsin(p_f.x()/p_f.mag())$
- Test is to compare its distribution to Moliere formula (pdg 26.10),
- 1 and 10 GeV mu and e, and 10 and 50GeV protons



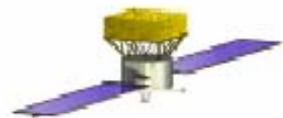
Results (5000 evts/run)

Particules	Energy	Slab type	Fit Sigma	Moliere Theta	0
Muon	1 GeV	Thick	4.32E-003	5.30E-003	
Muon	1 GeV	Thin	1.53E-003	1.86E-003	
Muon	10 GeV	Thick	4.34E-004	5.75E-004	
Muon	10 GeV	Thin	1.55E-004	2.02E-004	
Electron	1 GeV	Thick	4.37E-003	5.80E-004	
Electron	1 GeV	Thin	1.29E-003	2.04E-004	
Electron	10 GeV	Thick	4.00E-004	5.81E-004	
Electron	10 GeV	Thin	1.21E-004	2.04E-004	
Proton	10 GeV	Thick	4.26E-004	5.30E-004	
Proton	10 GeV	Thin	1.49E-004	1.88E-004	
Proton	50 GeV	Thick	8.70E-005	1.14E-004	



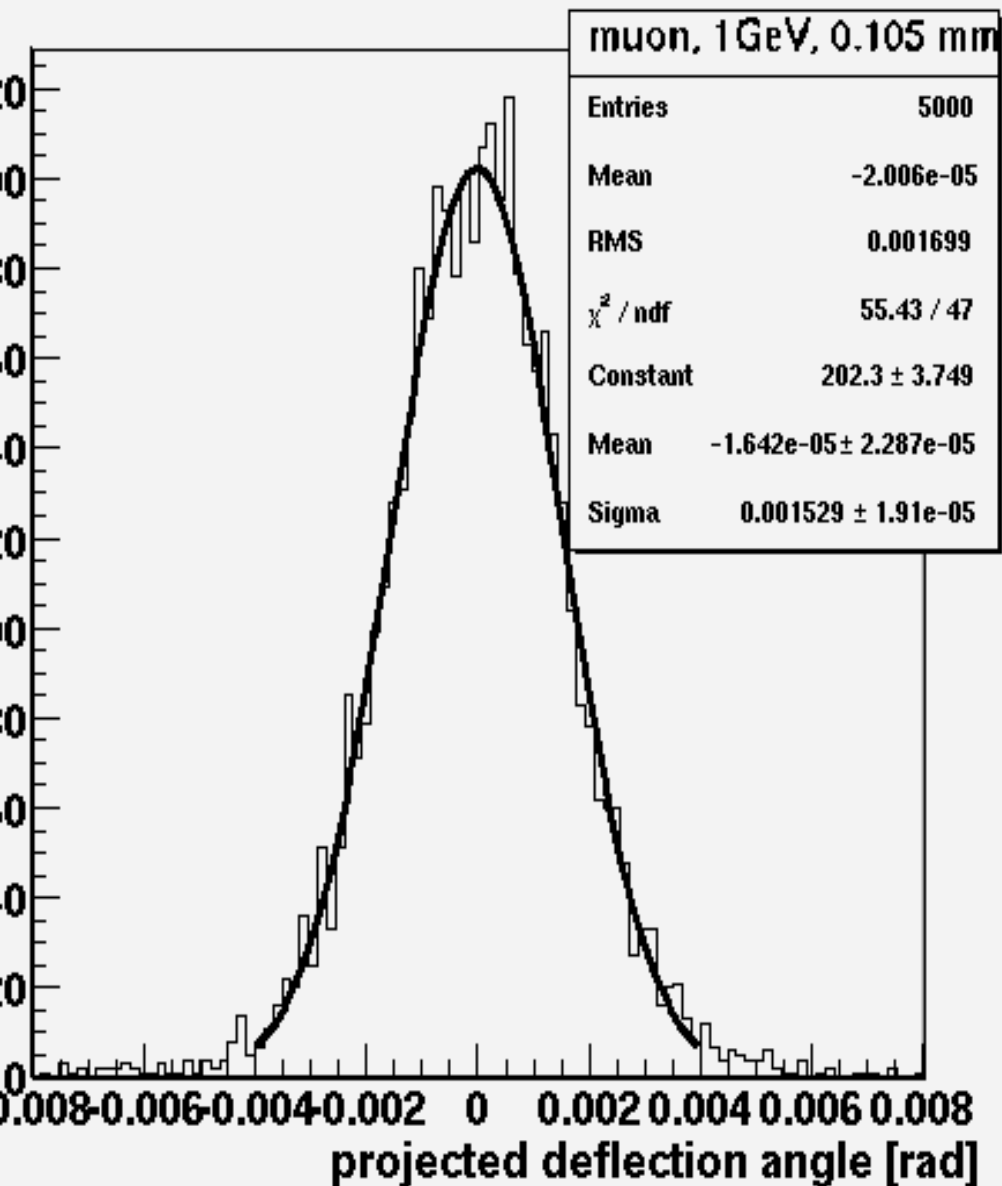
Conclusion

- " Discrepancy at the 20-24% level
- " Note that G4 does **NOT** use Moliere theory
- " Fits without tails don't improve significantly
- " Francesco performed tests directly on G4:
- " I will create a package from this userAlg. Note today's creation of another package: GEANT4TEST
- " More detailed studies to come....

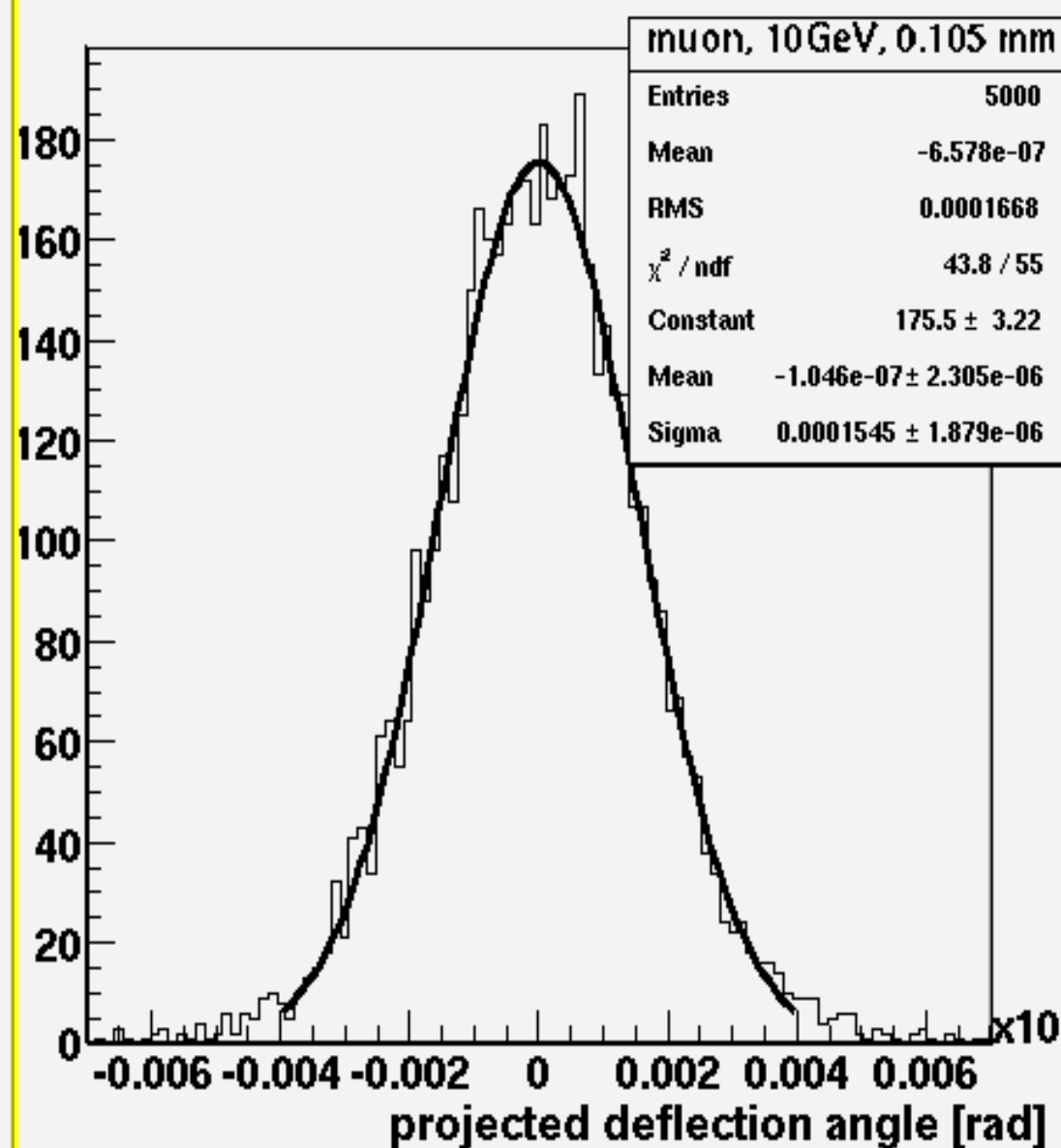


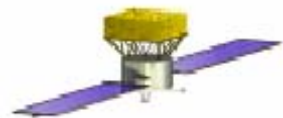
Muon, thin slab

Deflection angle through slab



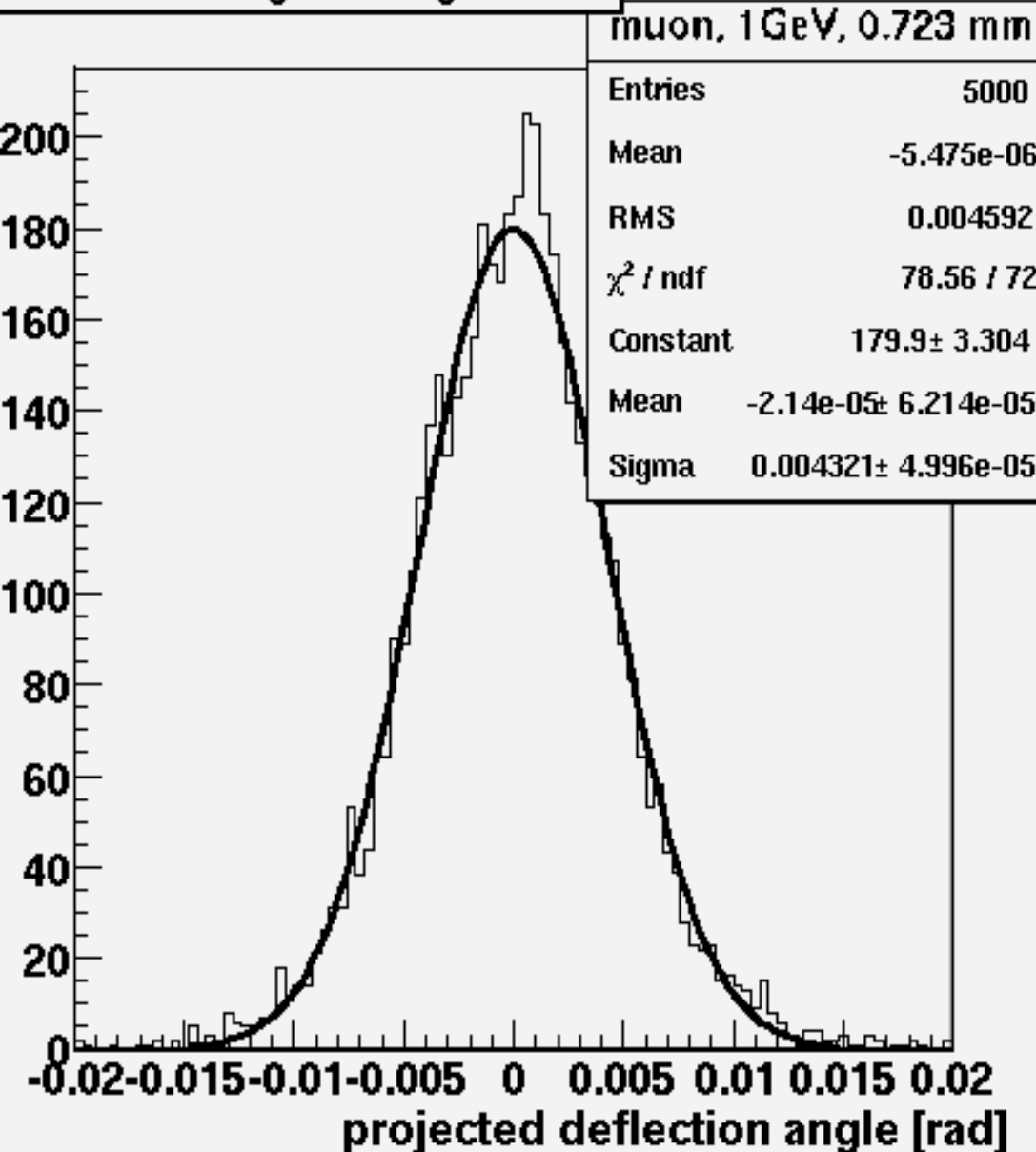
Deflection angle through slab



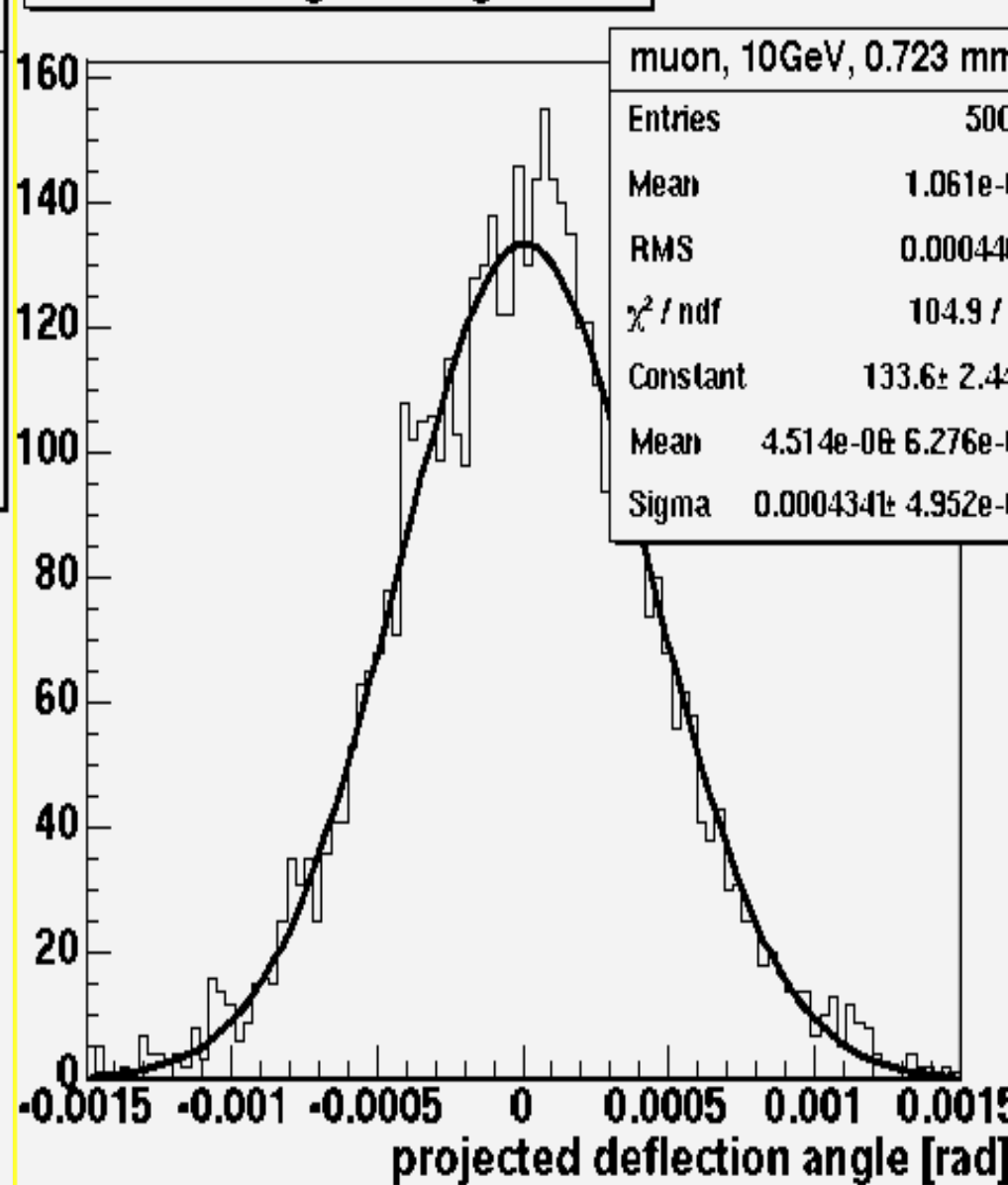


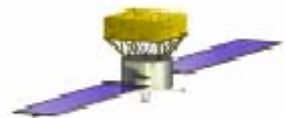
Muon, thick slab

Deflection angle through slab



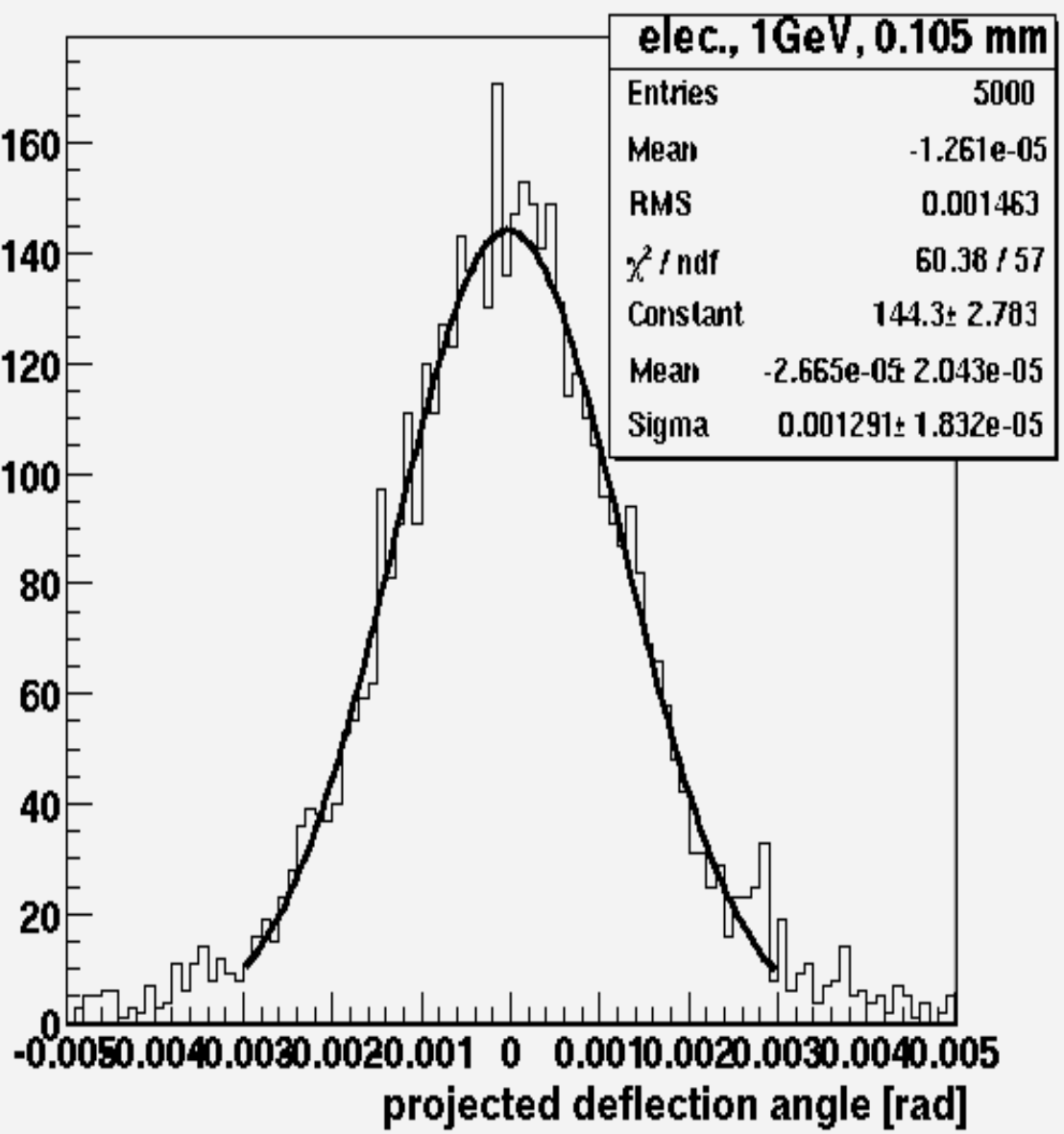
Deflection angle through slab



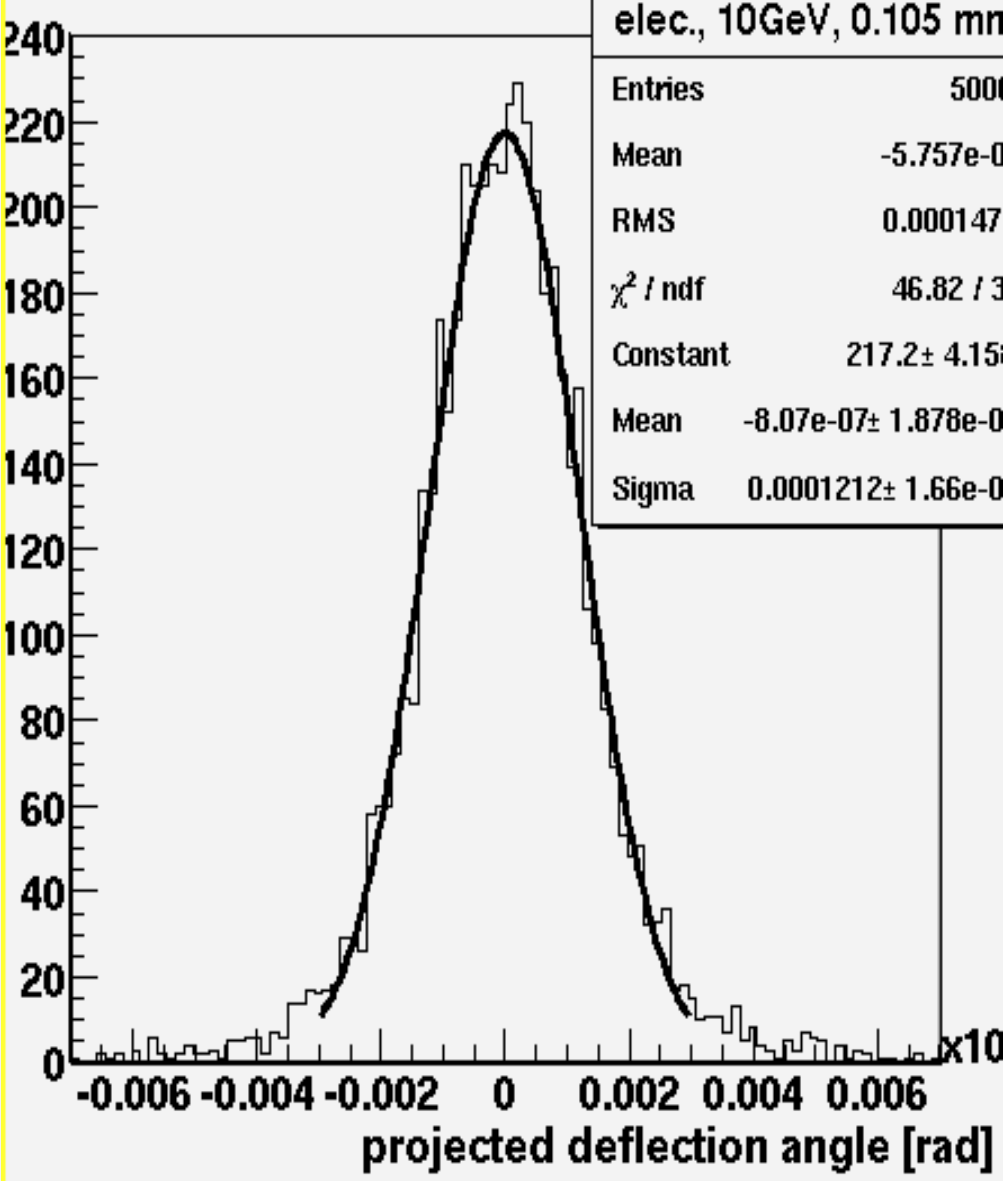


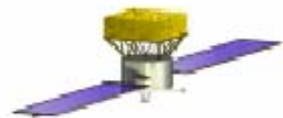
Electron, thin slab

Deflection angle through slab



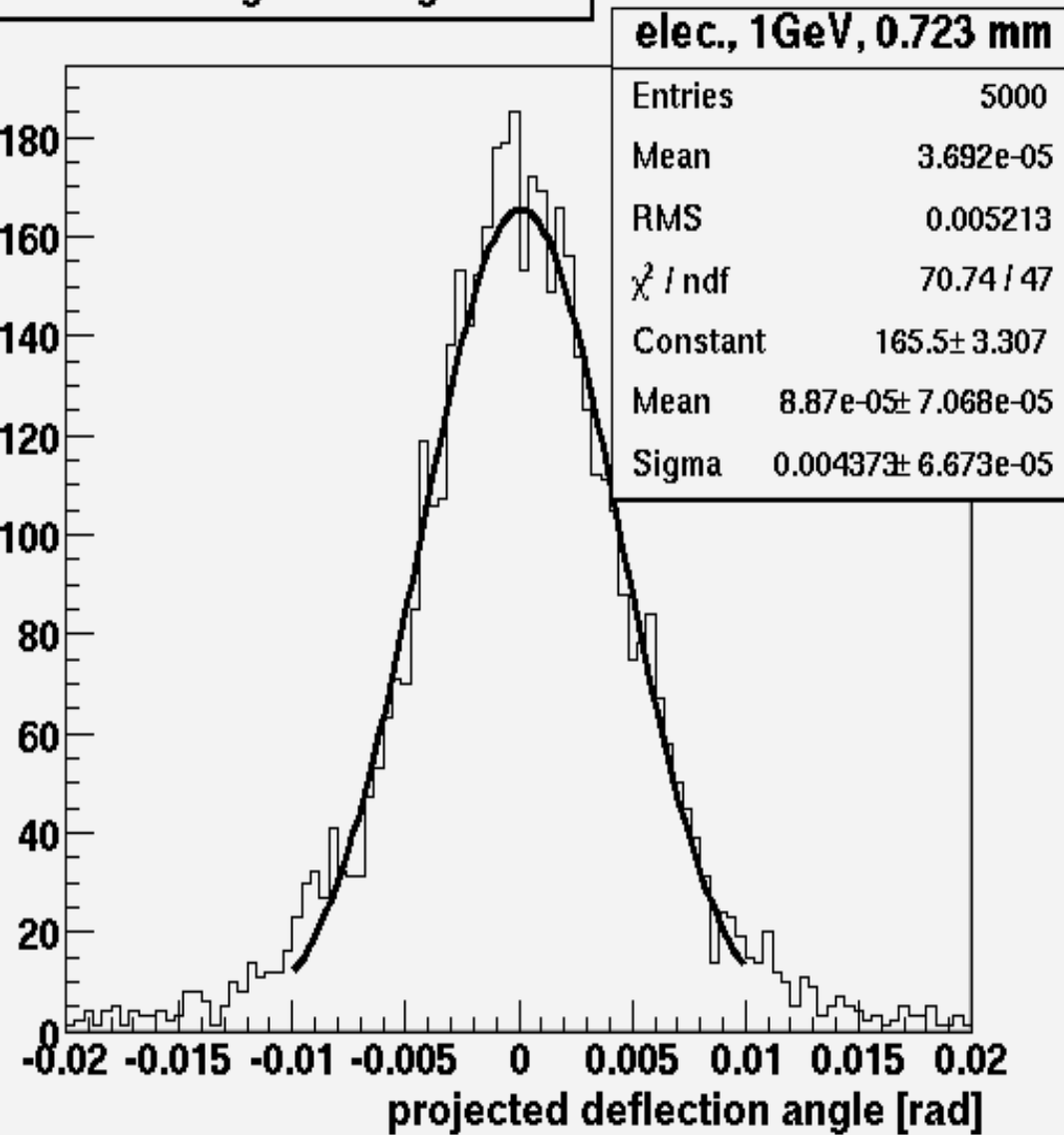
Deflection angle through slab



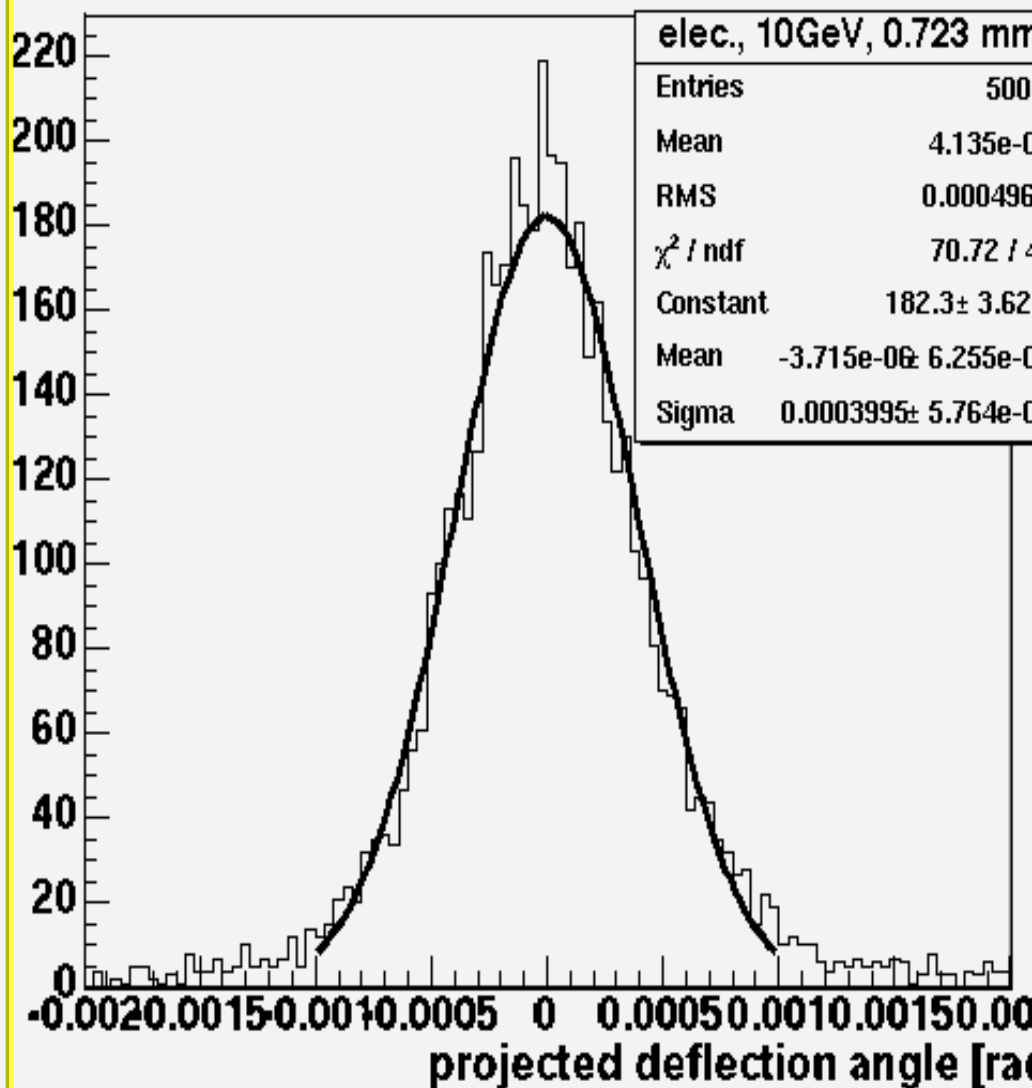


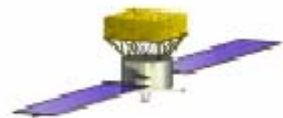
Electron, thick slab

Deflection angle through slab



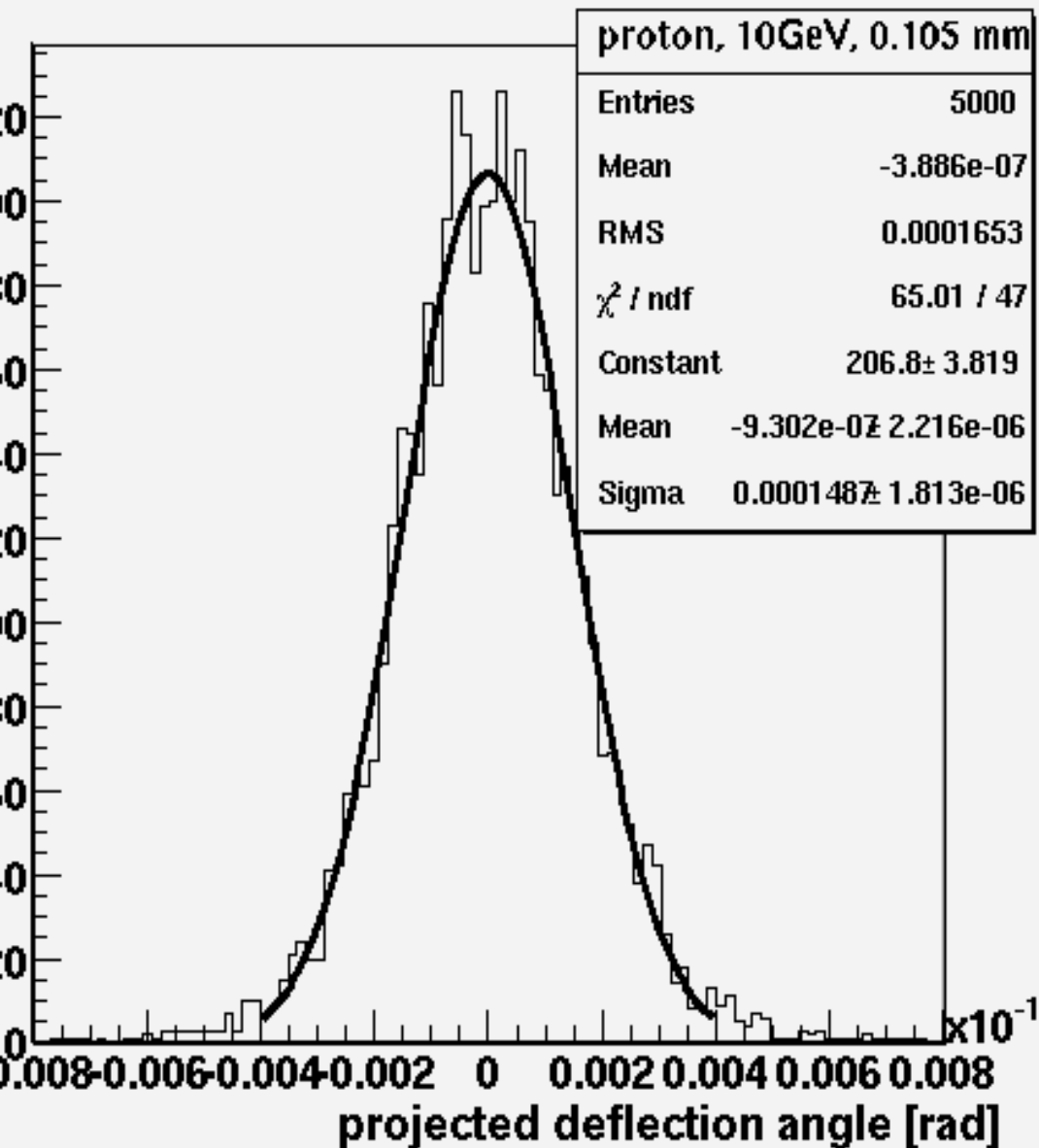
Deflection angle through slab



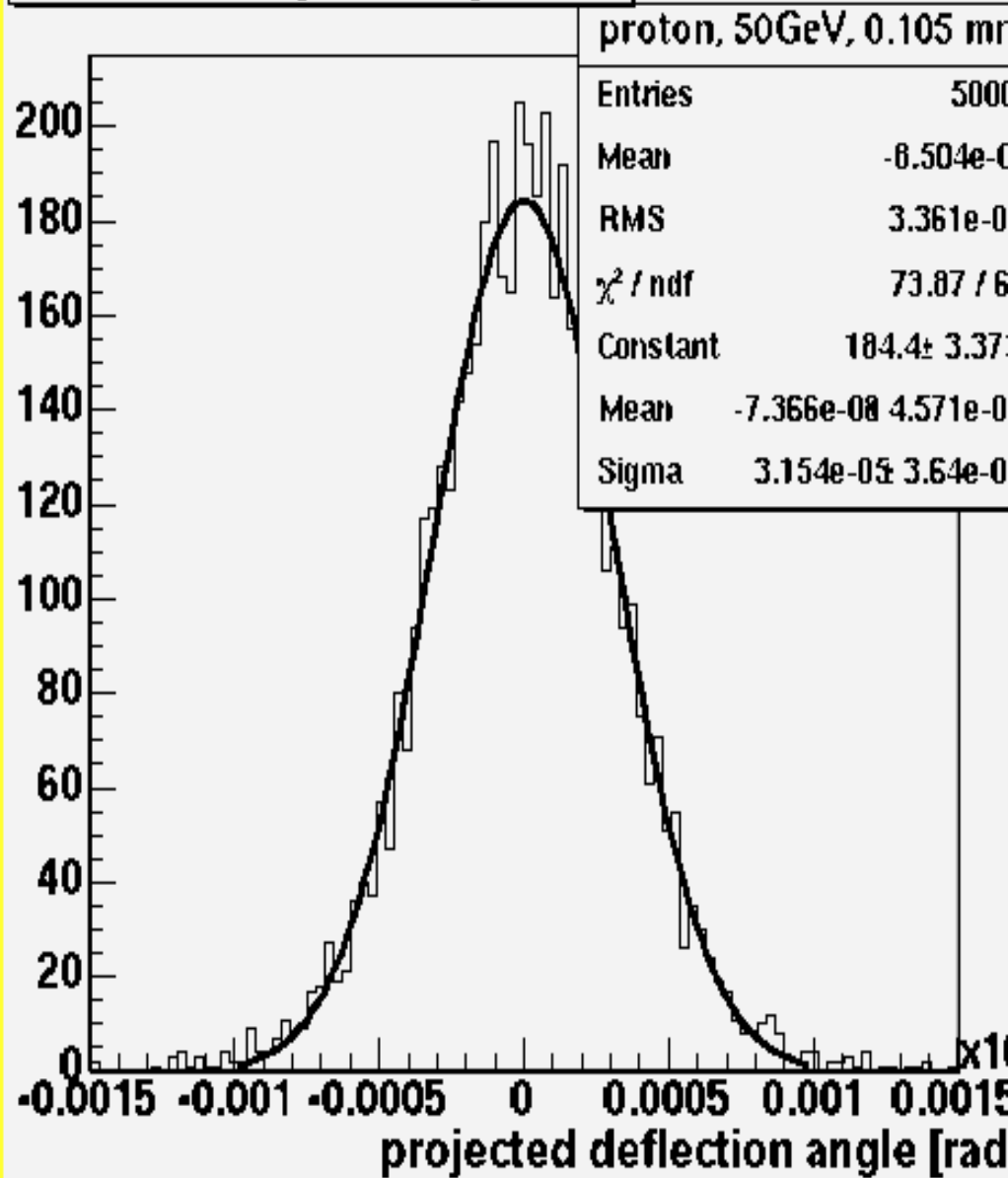


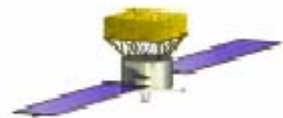
Proton, thin slab

Deflection angle through slab



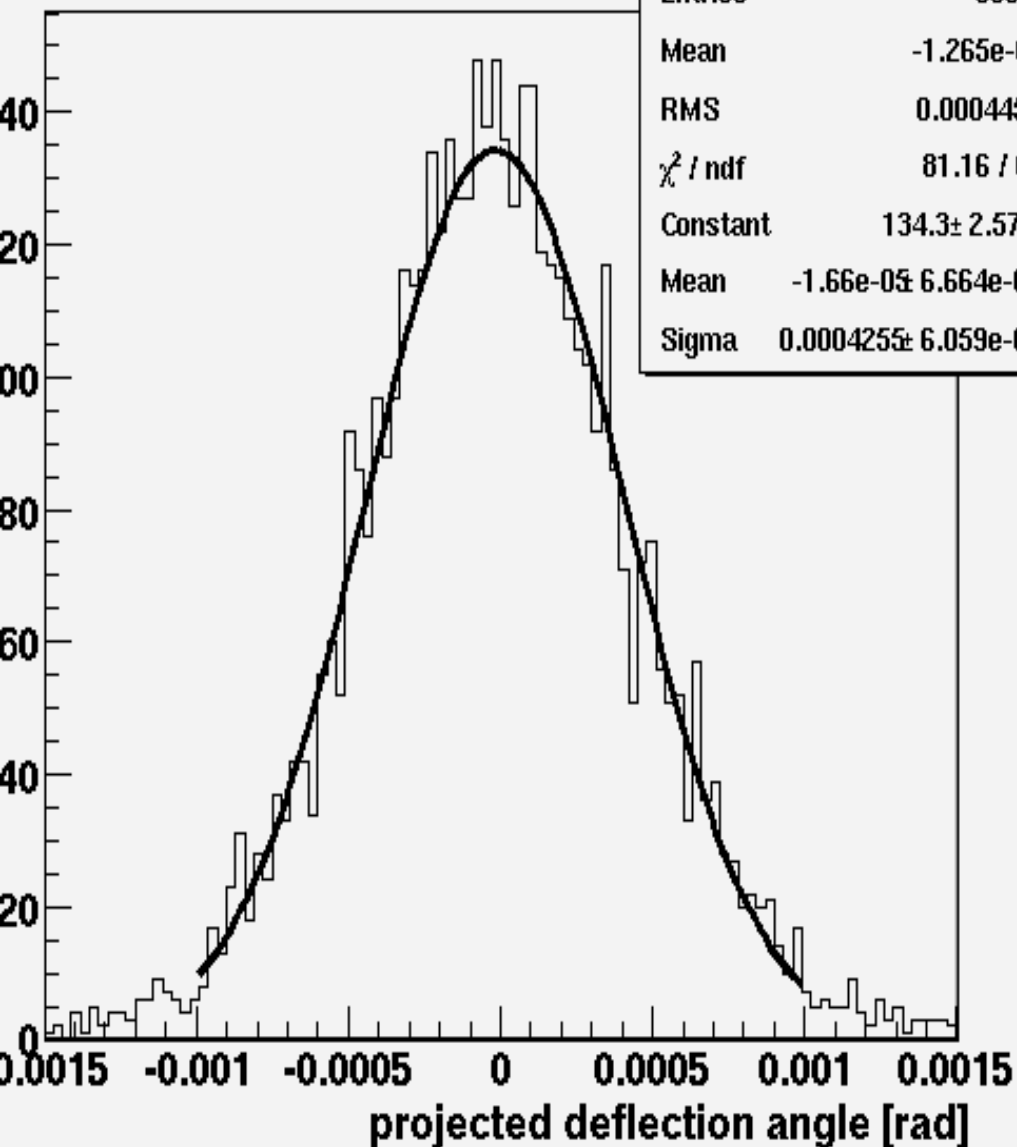
Deflection angle through slab





Proton, thick slab

Deflection angle through slab



Deflection angle through slab

