

Update on progress of PacTrk development

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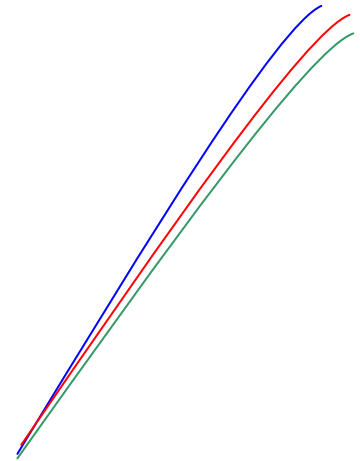
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Improvements on PacConfig

- Configuration can be set at argument.
 - No need to re-write & save for simple modification.
 - example: `workdir> testOneTrack outfile = "test.root" position = 1, 3, 2`
 - Accepted commands:
 - `include <filename>` to include any file as config file
 - `<filename.cfg>` to have config file read
 - `<parameter> = <value1>, <value2>, <value3>` to set value
 - `<groupname> { <parameter> = <value> }` to set group declaration
- View configured parameter.
 - Prints out configured parameter
 - Set `verbose = true` in configuration file

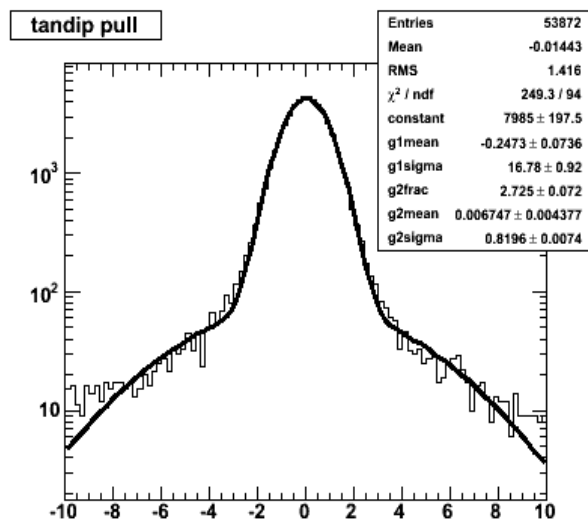
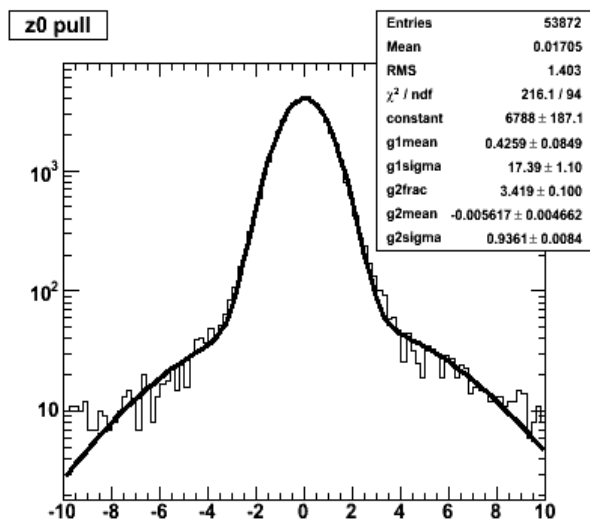
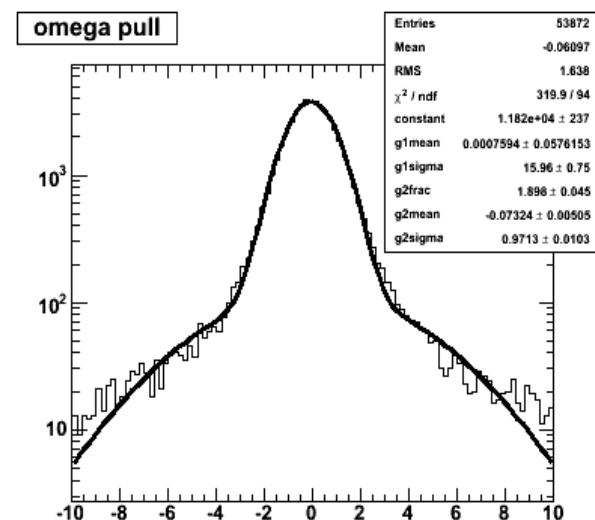
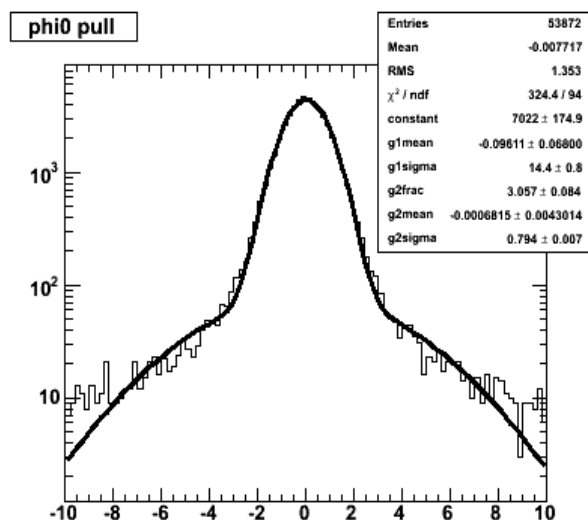
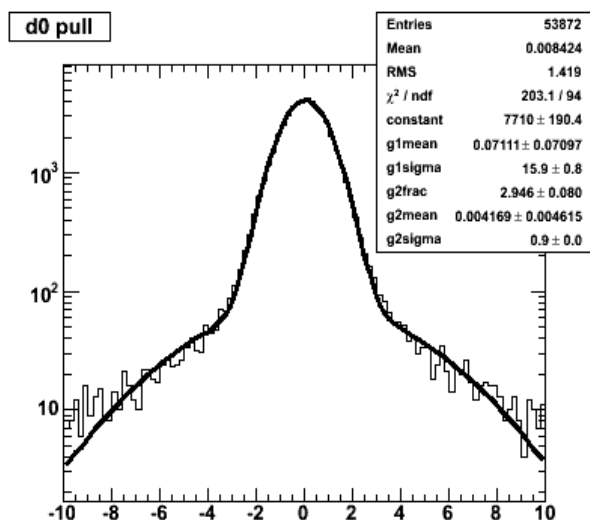
Development on **testTrackReconstruction**

- Purpose:
 - **Generate** Multiple Tracks with randomized momentum
 - **Simulate** detector effect with PacSimulate
 - **Reconstruct** each track to study statistics (Pull study)
 - Test 3-D Visual representation of tracks
- Pull (**rec-sim**)/**recerr** for 5 momentum parameters (d_0 , ϕ_0 , ω , z_0 , $\tan\delta\phi$)
 - Target pull distribution of full Babar simulation
 - Wide, asymmetric & shifted pull distribution for ω parameter
 - Landau shape for energy loss distribution was the cause for shift and asymmetry → Hand tune mean and width
 - Elongated scattering angle distribution's tail to obtain pull distribution of Babar full reconstruction

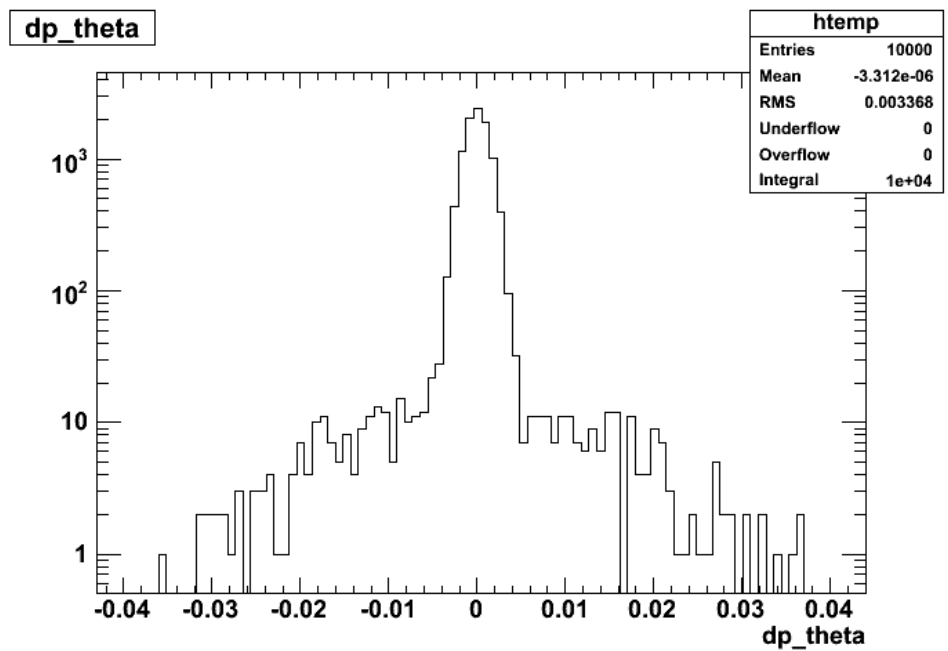
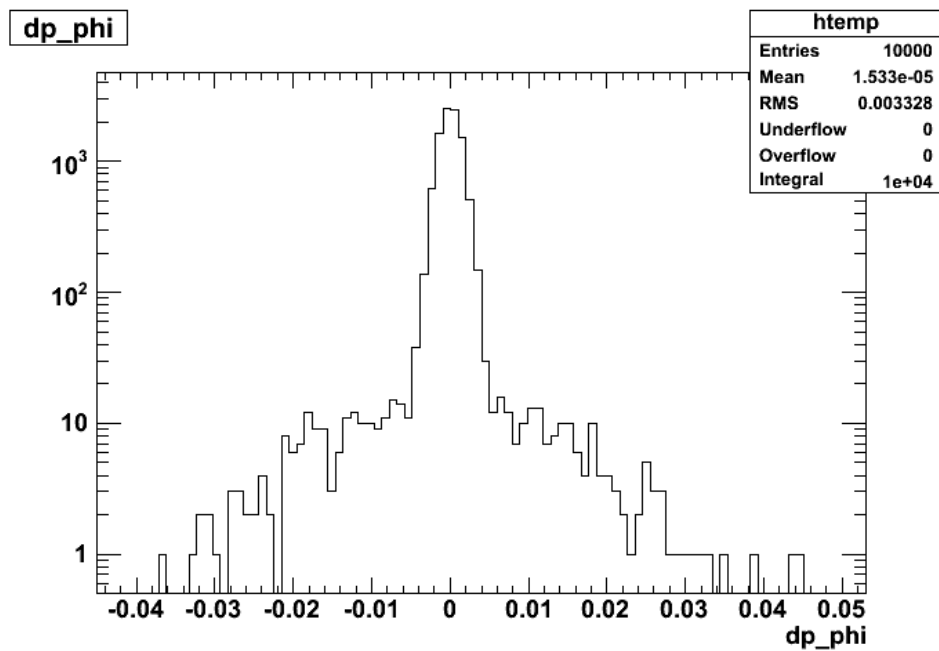
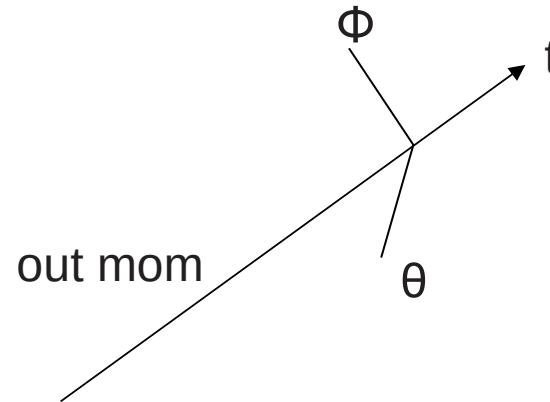
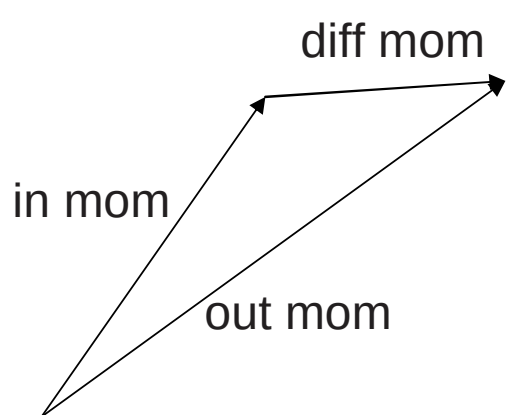


Pull distribution from full Babar Simulation

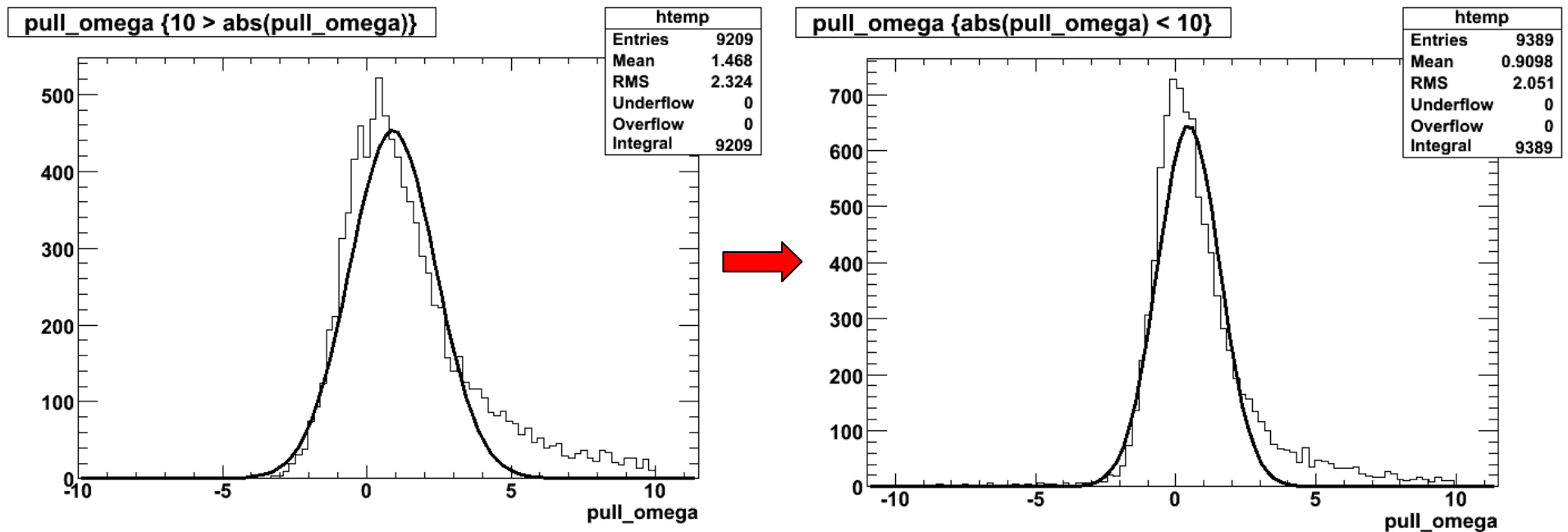
- Distribution was fitted to **Double Gaussian**



Scattering distribution with elongated tail



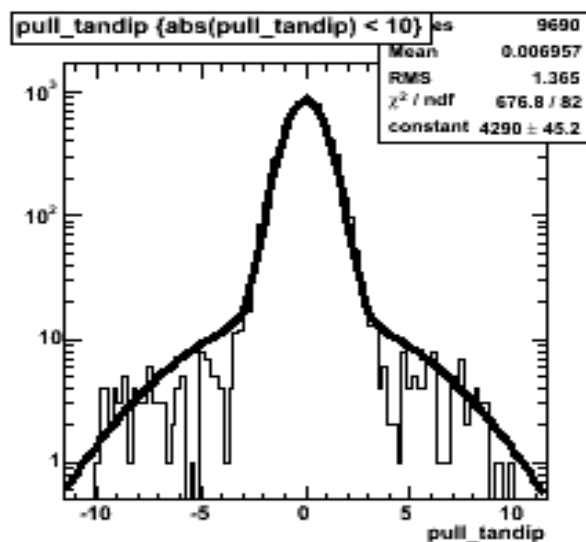
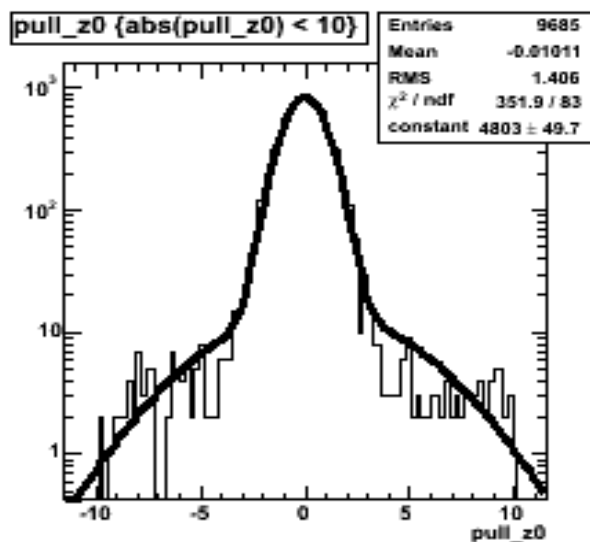
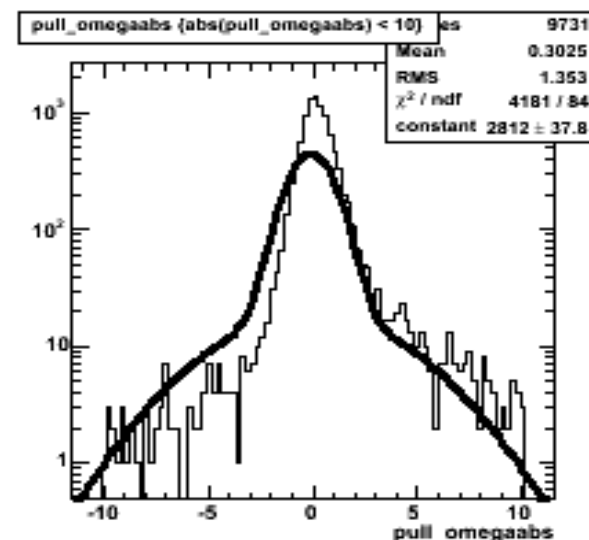
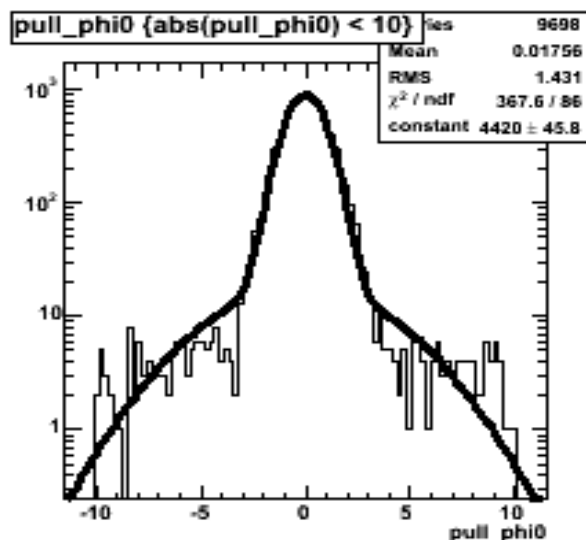
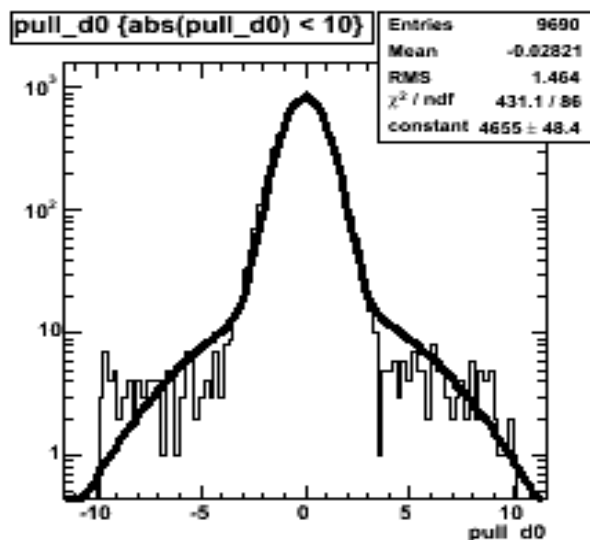
Effect of landau curve tuning on omega pull parameter



- Distribution was hand tuned while looking at Pull distribution
- Most probable value (peak) is approximately at 0
- Fit to gaussian returned width ~ 1.1 due to tail

Pull Plot from **testTrackReconstruction** w/ Landau E loss PDF

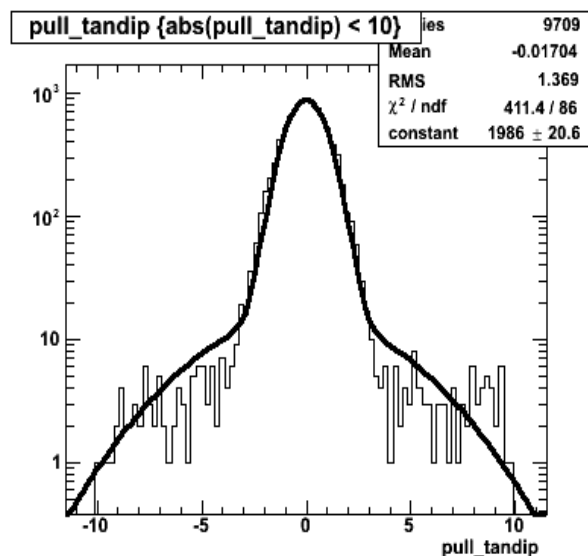
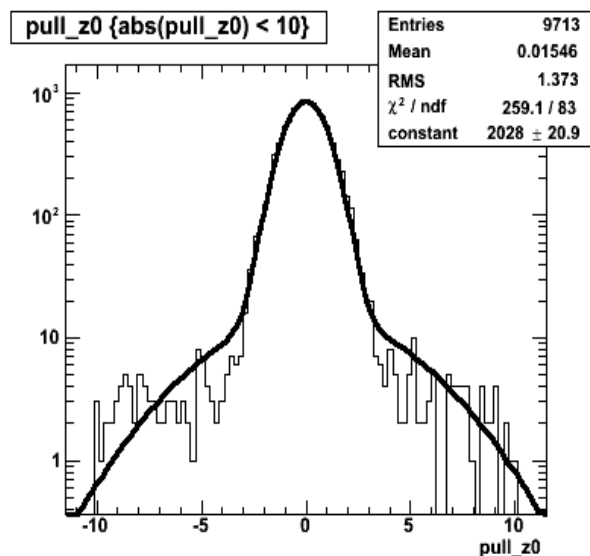
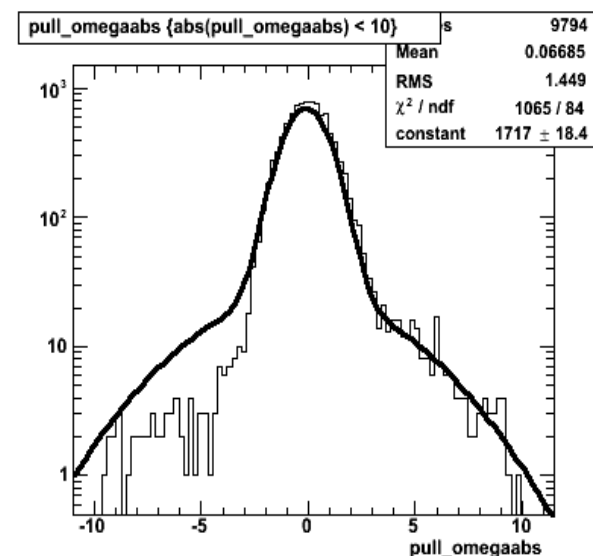
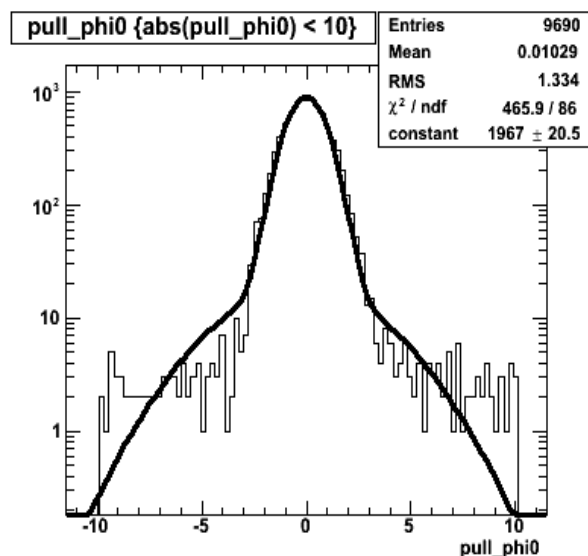
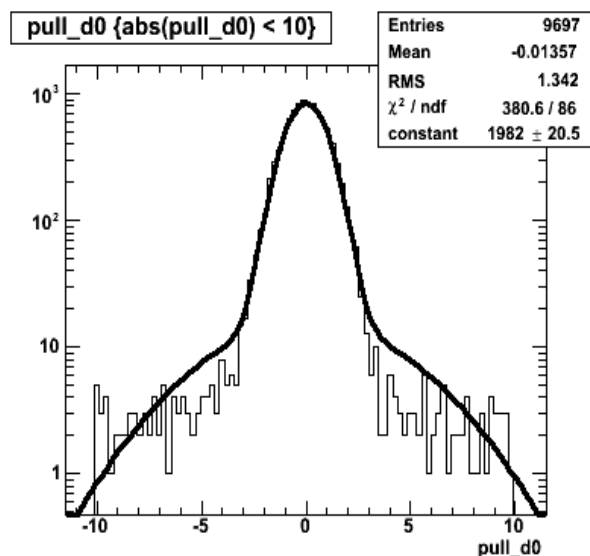
- PDF shapes are frozen from full BABAR simulation



PDF for E-loss should be closer to gaussian?

Pull Plot from **testTrackReconstruction** w/ Gaussian E loss PDF

- PDF shapes are frozen from full BABAR simulation



Gaussian e-loss distribution
with elongated tail

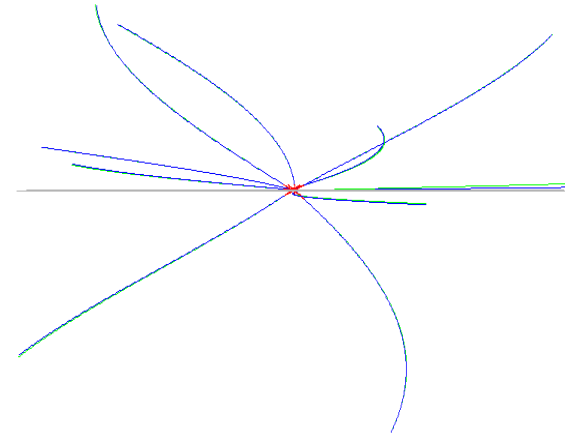
3-D visualization of tracks

- Storing **generated/ simulated/ reconstructed** track and **detector** as TPolyLine3D object
- Rotation in 3-D space
- Stored into file using TDirectory

```
/chargedtrj/0001/gen/TPolyLine3D  
/chargedtrj/0001/sim/TPolyLine3D  
/chargedtrj/0001/rec/TPolyLine3D  
/chargedtrj/0002/gen/TPolyLine3D  
/chargedtrj/0002/sim/TPolyLine3D  
/chargedtrj/0002/rec/TPolyLine3
```

- Detector model is still in development

Side view



Top view

