

Status of Mainz-Simulations

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Simulation & Reconstruction chain

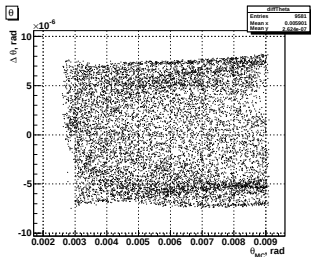
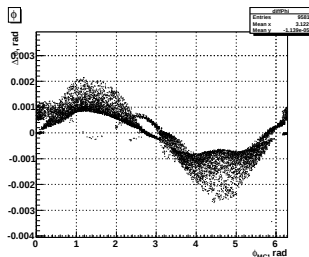
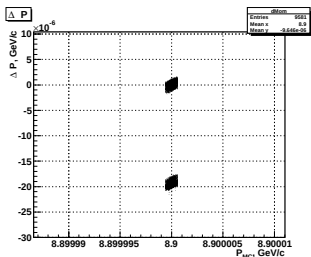
- 1 *Simulation*
- 2 *Digitization*
- 3 *Hits Reconstruction*
- 4 *Track Finder*
- 5 *Track Fitter*
- 6 *Determination particle parameters in Interaction Point*

Back-propagation with GEANE.

Mystery was solved!

Back-propagation with GEANE. Test with MC hits

Dipole & Solenoid magnetic field, $p_{\text{beam}} = 8.9 \text{ GeV/c}$



Dipole+Solenoid+Trans Magnetic Filed

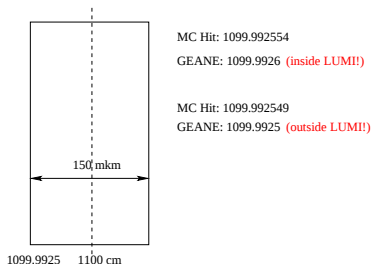
Back-propagation with GEANE. Test with MC hits

The question was:

Why there are two spots in ΔP and two peaks in histograms with parameters errors?

Answer:

Because of rounding accuracy!

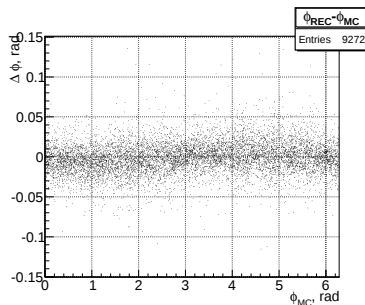
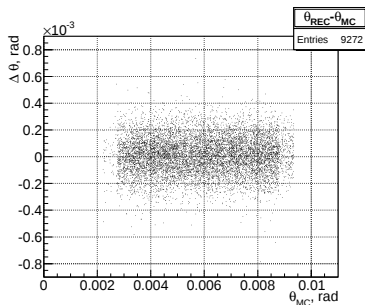


But it's small effect and it has not an influence to back-propagation of reconstructed track.

Back-propagation with GEANE.

Test with reconstructed tracks

Dipole & Solenoid magnetic field, $p_{\text{beam}} = 8.9 \text{ GeV}/c$



Angle uncertainties: $\sigma_{\theta} < 1.5 \text{ mrad}$, $\sigma_{\phi} < 50 \text{ mrad}$.

Current version in SVN

<https://subversion.gsi.de/trac/fairroot/browser/>

/pandaroot/trunk/lmd (all LMD classes)

/pandaroot/trunk/macros/lmd (macros for LMD) (*new!*)

Macros

- runLumi0SimBox.C
- runLumi1Digi.C
- runLumi2Reco.C
- runLumi3Finder.C
- runLumi4Fitter.C
- runLumi5Geane.C

Example

cd /macros/lmd

source config.sh

(configuration file)

./FirstRun

(create lumi geometry
and directories needed for
work)

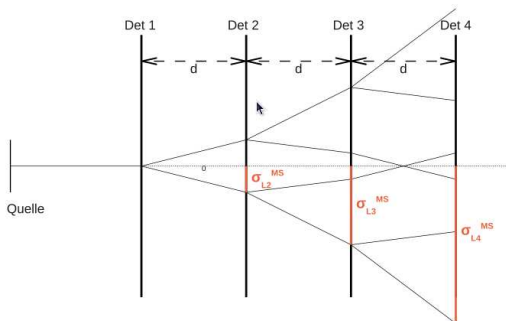
./runLumi

(run whole sim&rec chain)

Ongoing work. Add multiple scattering to hit errors

Least-squares method

$$\chi^2 = \frac{(x - (p_0 + p_1 z))^2}{\sigma_x^2} + \frac{(y - (p_2 + p_3 z))^2}{\sigma_y^2}$$



$$\sigma_{L2} = d\Delta\theta_{MS}, \sigma_{L3} = \sqrt{5}d\Delta\theta_{MS}, \sigma_{L4} = \sqrt{14}d\Delta\theta_{MS}.$$

Conclusion

Results

- Simulation Reconstruction chain is ready.
- Mystery with GEANE is understood.
- Current version in SVN.

Plans

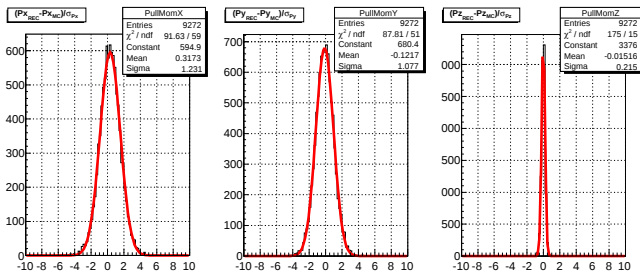
- Add contribution of multiple scattering to hits errors in Track Fitter
- Tests with different particle generators, background studies, etc.

Thank you for your attention!

Back-propagation with GEANE.

Test with reconstructed tracks

Dipole & Solenoid magnetic field, $p_{\text{beam}} = 8.9 \text{ GeV}/c$



Pulls for momentum coordinates.