

SID fitting with genfit

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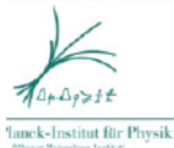
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Similar work have been done

GENFIT Tracking Tool in Marlin

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Munich, Germany

LCWS 2010, Beijing, China, March 2010



- But can not find in current Marlin

Flow

- Get track and hits from MC truth
- Smear the start position and momentum
- Create a track representation with mass hypothesis and fit with track fitter

Implementation

- Material
 - Create from GDML file generated by simulation
- Magnetic field
 - Constant field with $B=(0, 0, 3.5)$ Tesla
- Geometry
 - geometry interface not implemented
- Input from root format file
 - Read track(s) from truth(MCParticle)
 - Initial position and initial momentum
 - Read hits from truth(SimTrackerHits)
 - Cell id(not used)
 - Position(needed)
 - Momentum(used, should be calc. by tracking)

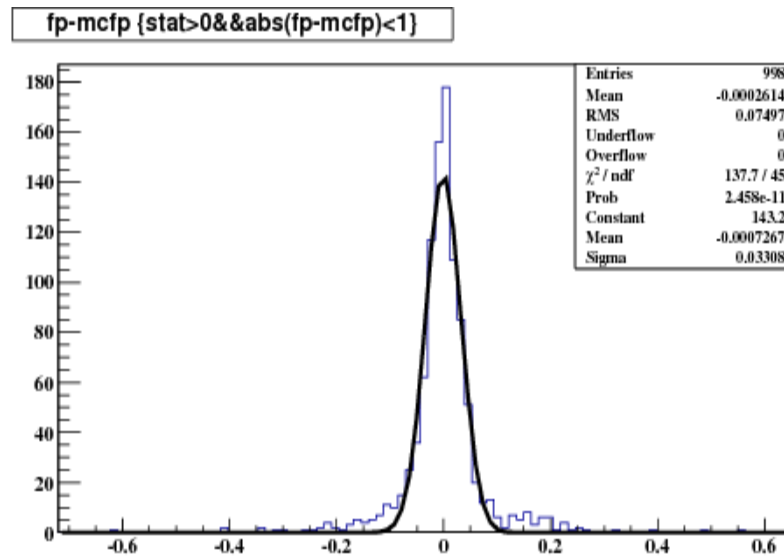
Fitting setup

- Initial track
 - from MC particle, no smear, resolution?
- Measurement
 - From truth hit coming from muon, no smear
- Hits smear setup(not used)
 - Smear pixel measurement with gauss at $(r\text{-phi}, z)=0.02\times 0.02$ mm for both barrel and endcap
 - Smear strip measurement with gauss at $(r\text{-phi}, z)= 0.05\times 0.1$ mm for both barrel and endcap
- Resolution
 - $1/\sqrt{12}$ * with of detector elements
- Fit hits as space points using genfit2[*]

*NIM A, Vol 620, 518-525 (2010) Authors: C. Hoppner, . Neubert, B. Ketzer, S. Paul

First look of momentum distribution

- Single muon 10GeV, 1000 events
- Efficiency 99.8%
- Resolution 33MeV



Issues

- Geometry requirements
 - For a given cell number knows the direction of boundaries for each detector element?
- Distinguish the primary particle and hits
 - Identify by pdg ID with single event case (use Status ?)
- Collection name and structure change constantly
 - How to switch between versions smoothly
- Unit should be treated carefully
 - Unit in simulation: mm, GeV, ... ?
 - Unit in track fitting : cm, GeV, ns

Next

- See the reason of big resolution and efficiency lost
- Use smeared track and hits and set the resolution
- Move the fitting to the Marlin framework