



# Homogenous B-Field Momentum Resolution Study

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# Simulation Parameters

- Simulation run entirely in Mokka
- Particle Gun:
  - **500 x 25GeV pi-**
  - **Gun position  $x = \langle 0, 0, 10\text{mm} \rangle$**
  - **Gun direction  $v = \langle 0, 1, 0 \rangle$**
- Pad Layout:
  - **Rectangular shaped pads**
  - **Pad height = 6mm (~500 rows)**
  - **Pad width = 2mm**
  - **Staggered rows (every second row was displaced by  $\frac{1}{2}$  pad width)**



# Simulation Parameters cont...

- TPC (modified TPC04)
  - Max drift length = 2.5m
  - Inner radius = 0.32m
  - Outer radius = 1.69m
  - 2 GEMs with effective gain = 45
  - Drift velocity = 35mm/us
  - Gas transverse diffusion = 40um/sqrt(cm)
  - Gas longitudinal diffusion = 200um/sqrt(cm)
- ILC
  - Constant B field = 4T



# Reconstruction Parameters

- Bare bones reconstruction/"analysis" chain:

```
<execute>
.   <processor name="MyAIDAProcessor" />
.   <processor name="MyConditionsProcessor" />
.   <processor name="MyTrackerRawDataToDataConverter" />
.   <processor name="MyPedestalSubtractor" />
.   <!--processor name="MyLinearityCorrector" /-->
.   <!--processor name="MyTimeShiftCorrector" /-->
.   <processor name="MyPulseFinder" />
.   <processor name="MyGainCorrectorProcessor" />
.   <processor name="MyCountsToPrimaryElectronsProcessor" />
.   <processor name="MyHitFinder" />
.   <processor name="MyTrackSeeder" />
.   <processor name="MyTrackFitterLikelihood" />
.   <processor name="MyBasicRunAnalysis" />
.   <!--processor name="MyHepRepOutput" /-->
.   <processor name="MyLCI0OutputProcessor" />
</execute>
```

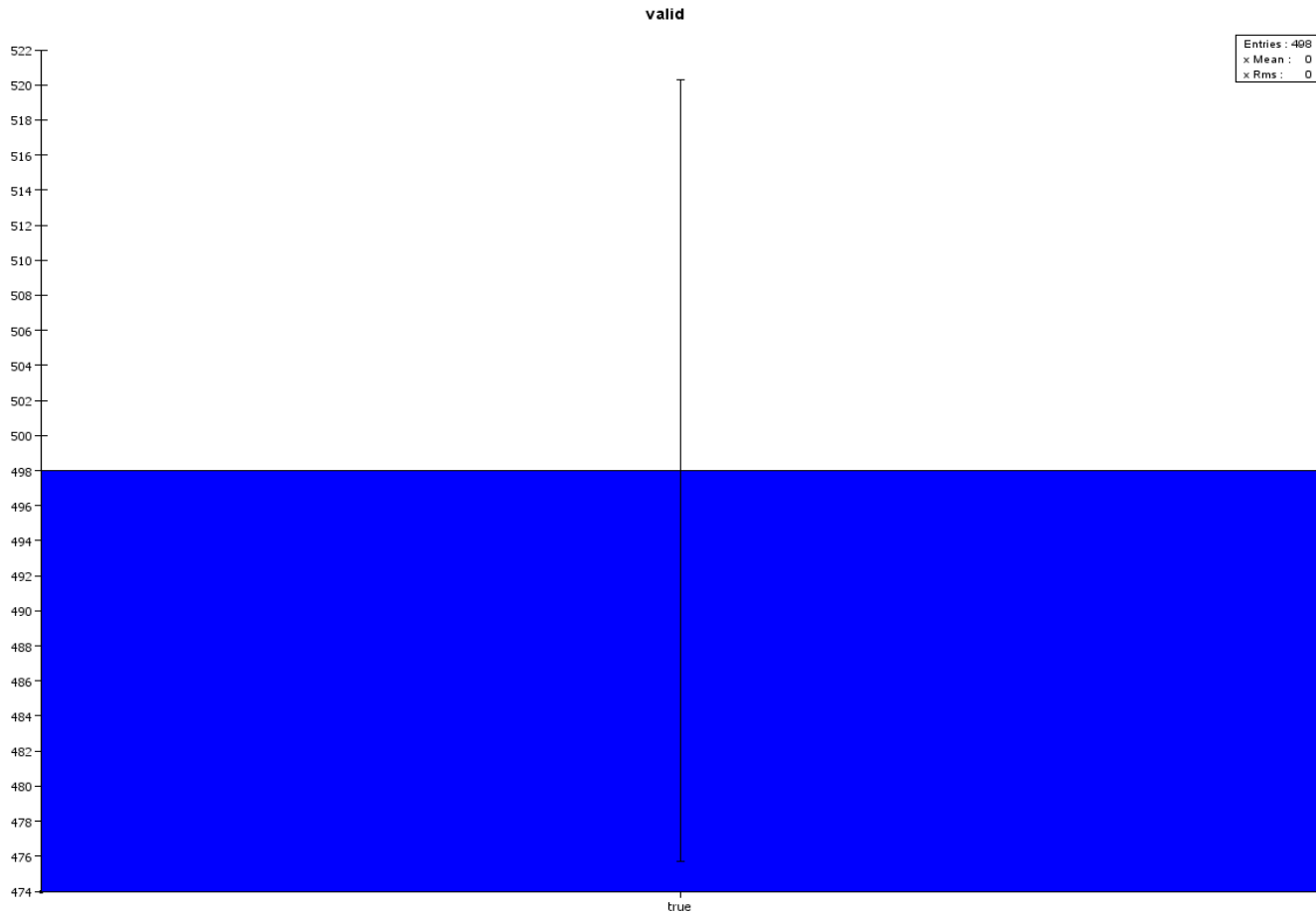
- LikelihoodFitter parameters:

```
<processor name="MyTrackFitterLikelihood" type="TrackFitterLikelihoodProcessor">
.   <parameter name="Sigma0" type="double">0.646</parameter>
.   <parameter name="SigmaZ" type="double">0.5</parameter>
.   <parameter name="FitSigma0?" type="boolean">>false</parameter>
.   <parameter name="Noise" type="double">0.01</parameter>
</processor>
```



# Results

- 100% convergence rate





# Results continued...

- Resolution:  $\sigma(\Delta p) \sim 0.0862\text{GeV}$ ,  $p_T = 25\text{GeV}$ ,  
 $\sigma(1/p_T) \sim 1.37 \times 10^{-4} (\text{GeV}/c)^{-1}$ , goal  $\sim 2 \times 10^{-4}$

