

Λ^0 Digits Embedding for the Inner Tracker Optimization

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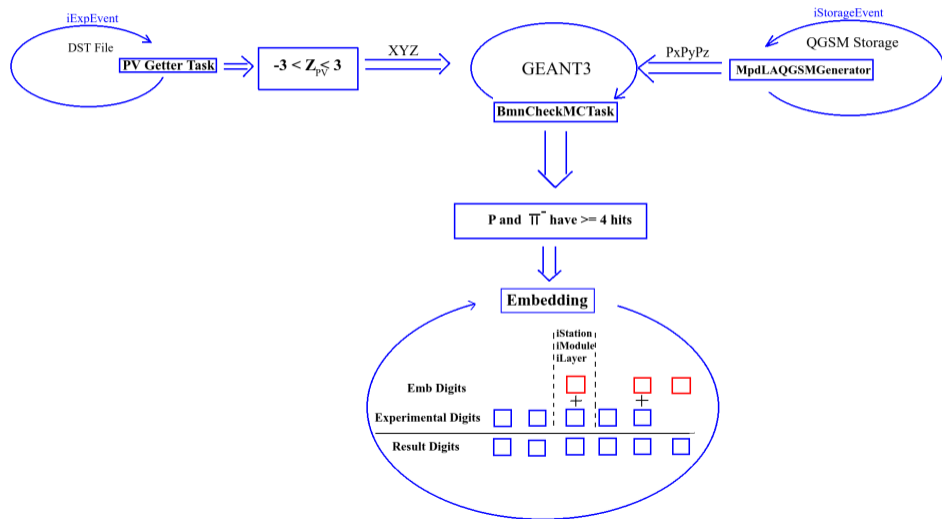
Joint Institute for Nuclear Research, Laboratory of High Energy Physics

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Digit Level Embedding Stages

- Create Λ^0 ROOT storage from DCMQGSM generated data sets
- Generate decay events with the storage lambdas put to the primary vertices's positions from an exp file
- Filter only reconstructable decays
 - Apply signal scale normalization ?
 - Embed into real events
 - Measure the efficiency of the each reconstruction stage
 - Tune tracking algorithm accordingly

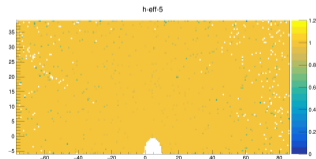
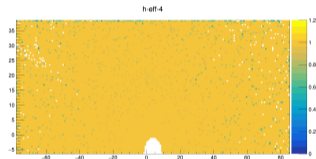
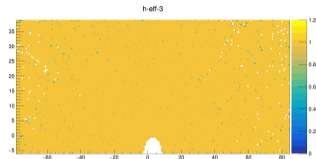
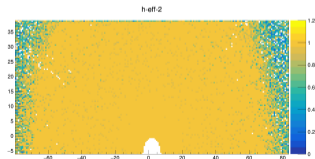
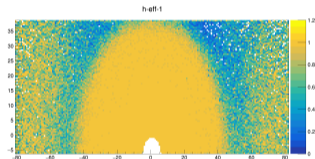
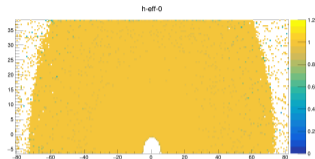
Embedding Workflow



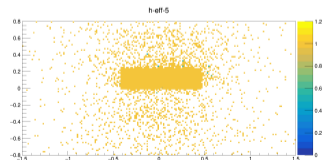
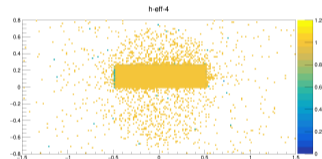
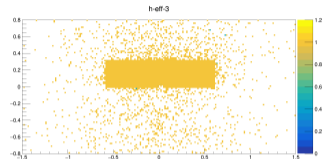
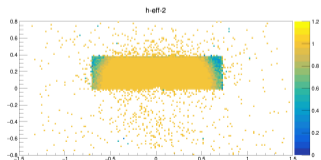
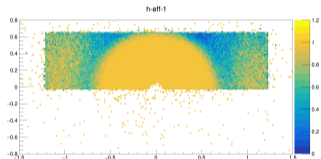
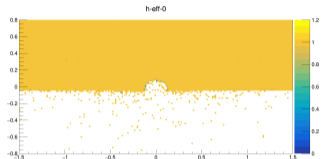
GEM HitMaker Efficiency Test

	BigZone	HotZone
Station = 0 iMod = 0	0.975684	0.989612
iMod = 1	0.884250	0.983110
Station = 1 iMod = 0	0.966203	0.988338
iMod = 1	0.796322	0.939690
Station = 2 iMod = 0	0.954382	0.981046
iMod = 1	0.765758	0.951376
Station = 3 iMod = 0	0.983941	0.970588
iMod = 1	0.956071	0.981878
Station = 4 iMod = 0	0.948309	0.958115
iMod = 1	0.799820	0.947141
Station = 5 iMod = 0	0.965322	0.972973
iMod = 1	0.942036	0.966245

2D stations coordinate efficiency for single protons



2D stations tan efficiency for single protons



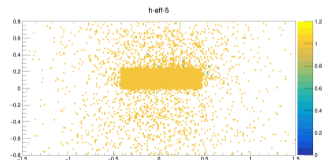
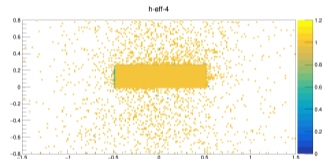
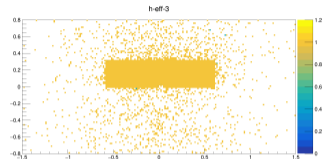
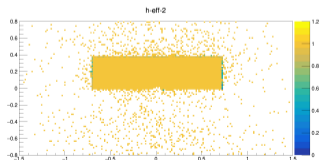
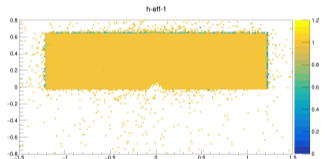
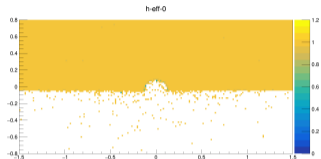
Interpolate X Y to the center of the drift area

Interpolate X Y to the center of the drift area

```
x = ((FairMCPoint*)pt) -> GetX();  
y = ((FairMCPoint*)pt) -> GetY();
```

```
if(mod -> GetElectronDriftDirection() == ForwardZAxisEDrift)  
    driftCenterShift = 0.15;  
else  
    driftCenterShift = 0.75;  
x = ((CbmStsPoint*)pt) -> GetX(z + driftCenterShift);  
y = ((CbmStsPoint*)pt) -> GetY(z + driftCenterShift);
```

2D stations tan efficiency for single protons corrected



GEM HitMaker Efficiency Test

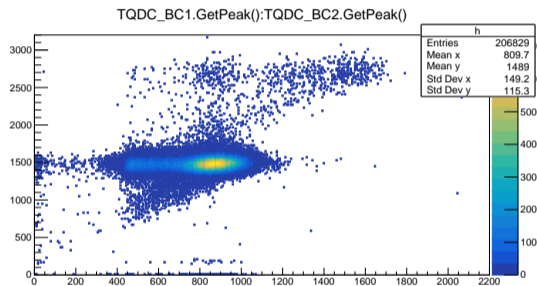
Old approach

	BigZone	HotZone
Station = 0 iMod = 0	0.975684	0.989612
iMod = 1	0.884250	0.983110
Station = 1 iMod = 0	0.966203	0.988338
iMod = 1	0.796322	0.939690
Station = 2 iMod = 0	0.954382	0.981046
iMod = 1	0.765758	0.951376
Station = 3 iMod = 0	0.983941	0.970588
iMod = 1	0.956071	0.981878
Station = 4 iMod = 0	0.948309	0.958115
iMod = 1	0.799820	0.947141
Station = 5 iMod = 0	0.965322	0.972973
iMod = 1	0.942036	0.966245

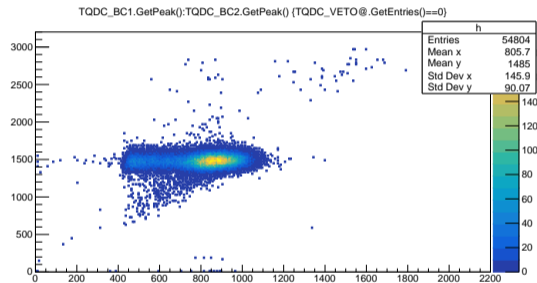
Interpolated drift center

	BigZone	HotZone
Station = 0 iMod = 0	0.993377	0.991044
iMod = 1	0.995249	0.992347
Station = 1 iMod = 0	0.995976	0.995021
iMod = 1	0.997108	0.994269
Station = 2 iMod = 0	0.991839	0.994784
iMod = 1	0.980684	0.993042
Station = 3 iMod = 0	0.999371	1.000000
iMod = 1	0.992060	0.995150
Station = 4 iMod = 0	0.992662	0.998661
iMod = 1	0.995477	0.992465
Station = 5 iMod = 0	0.998552	0.996721
iMod = 1	0.996840	1.000000

Run 4649 BC1 vs BC2 TQDC Amps

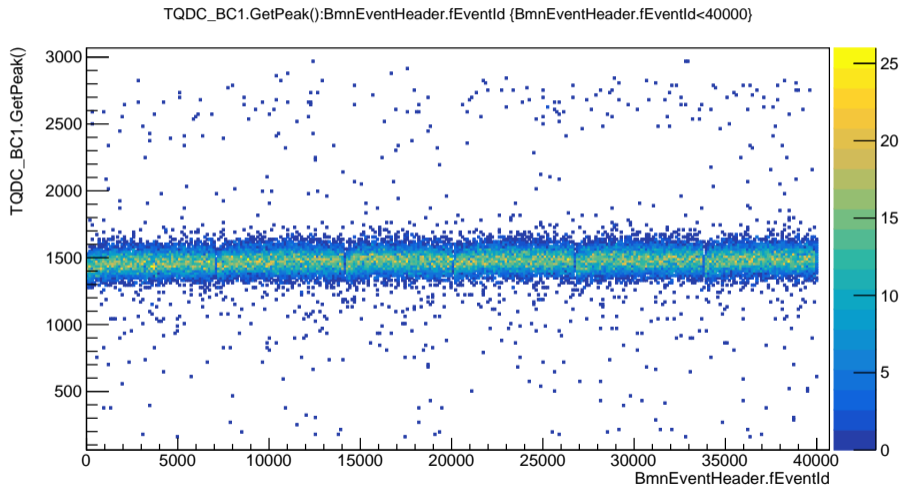


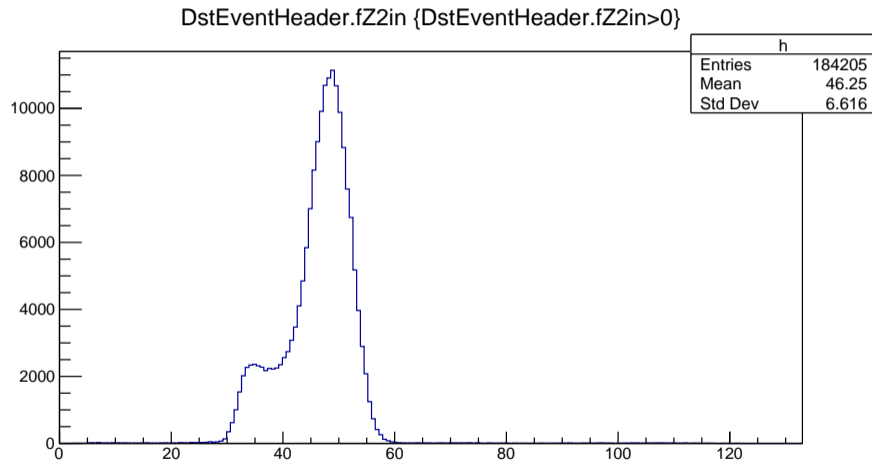
All



VETO filtered

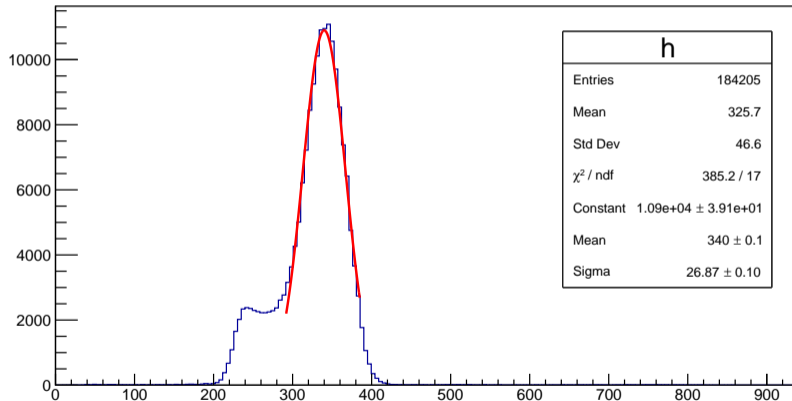
Run 4649 BC1 vs EventId



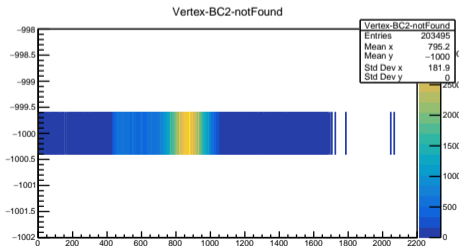
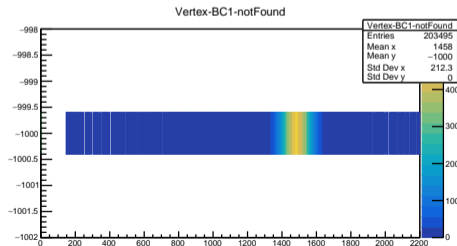
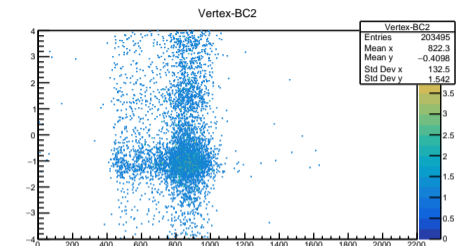
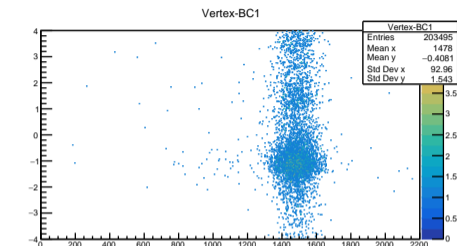
Run 4649 z^2 with default (SRC) constants

Run 4649 z^2 after simple rescale

DstEventHeader.fZ2in*324/46.0 {DstEventHeader.fZ2in>0}



Run 4649 Vertex Z vs Beam Counters



Tracking hits number dependency

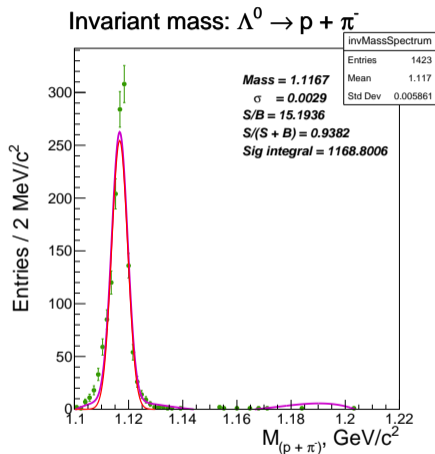


Figure: Min 4 hits

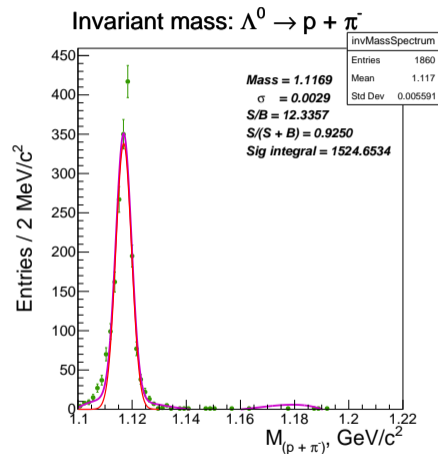


Figure: Min 5 hits

Tracking hits number dependency

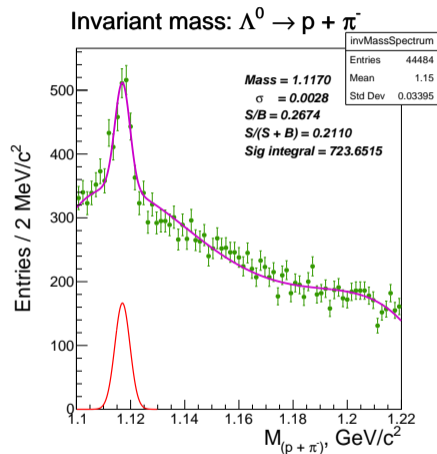


Figure: Min 4 hits

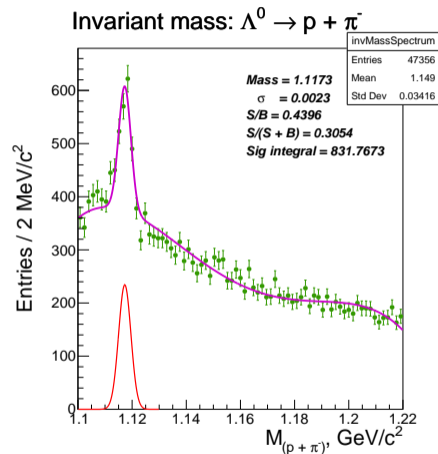


Figure: Min 5 hits