

Λ^0 Digits Embedding for the Inner Tracker Optimization

Ilnur Gabdrakhmanov

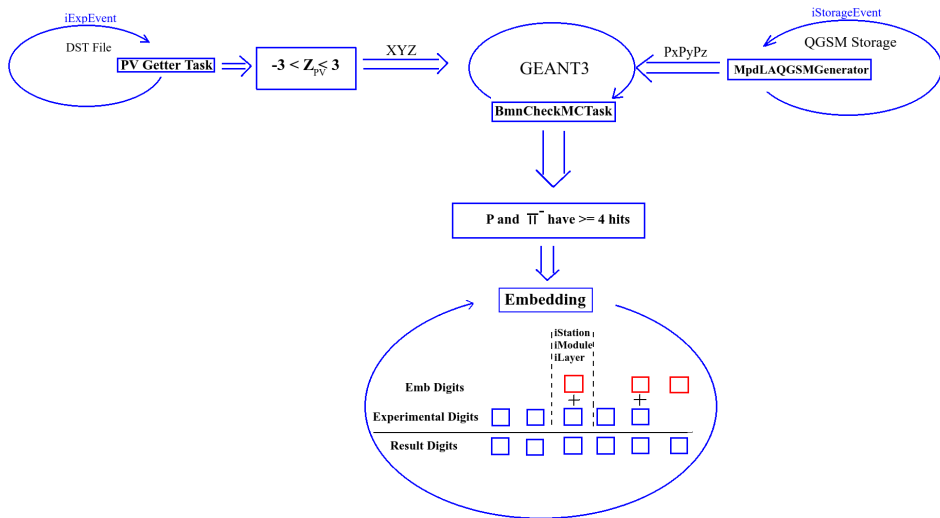
Joint Institute for Nuclear Research, Laboratory of High Energy Physics

Dubna March 5, 2020

Digit Level Embedding Stages

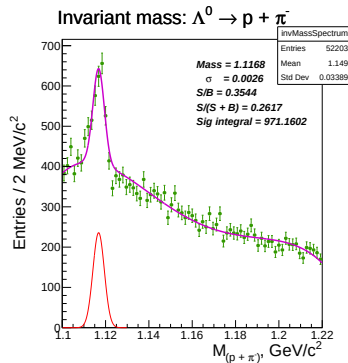
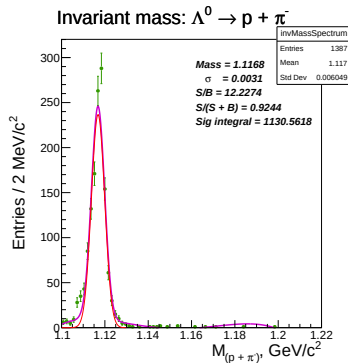
- Create Λ^0 ROOT storage from DCMQGSM generated data sets
- Generate decay events with the storage lambdas put to the primary vertices's positions from an exp file
- Filter only reconstructable decays
 - Apply signal scale normalization ?
 - Embed into real events
 - Measure the efficiency of the each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

Embedding Workflow

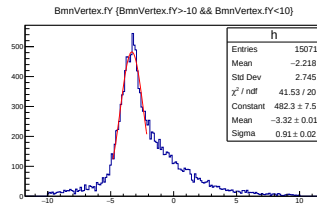
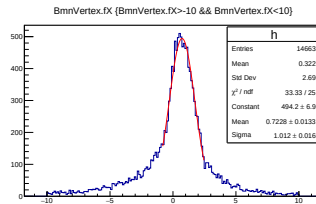
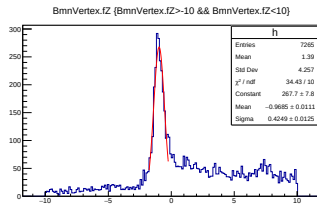


Run 4649 stat

- Total Events: 203495
- Vertex Found: 15743
- Vertex Z in [-3..3] : 4132



Run 4649 Vertex



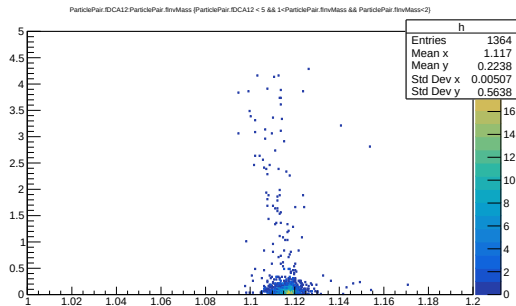


Figure: MC Mass:DCA12 distribution

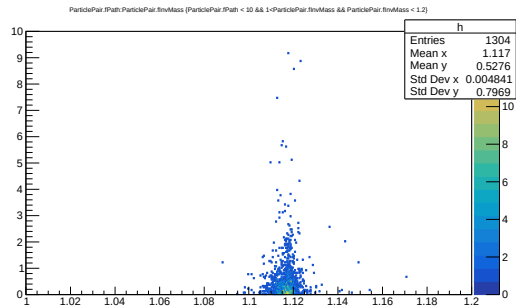
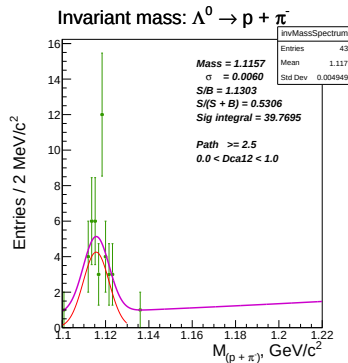
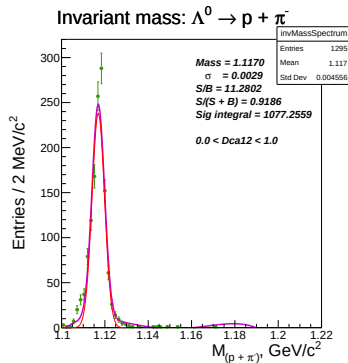
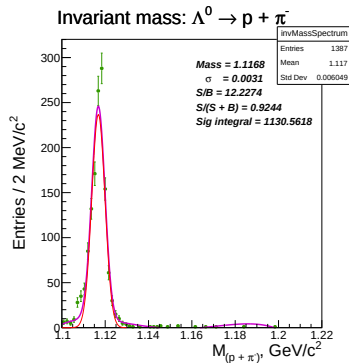


Figure: MC Mass:Path distribution

Run 4649 Vertex



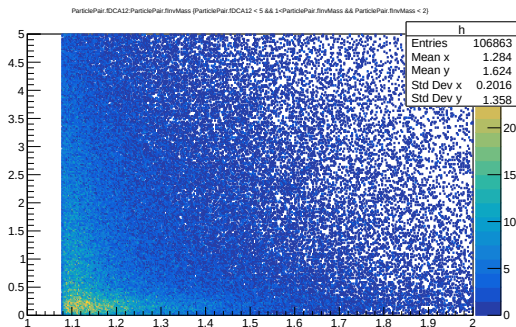


Figure: Exp Mass:DCA12 distribution

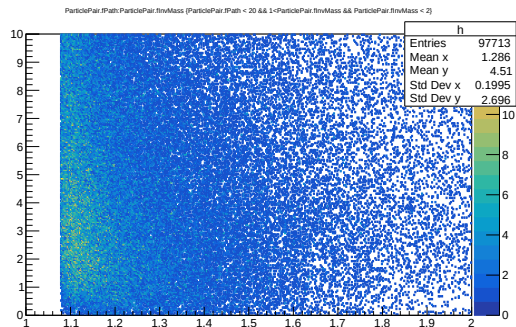
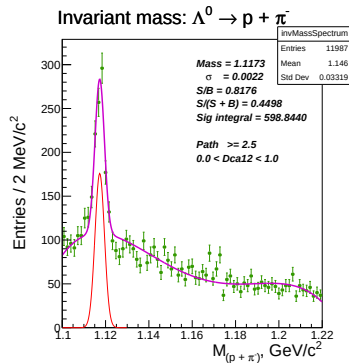
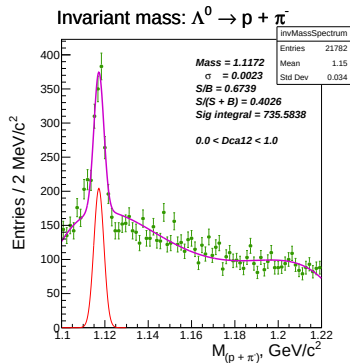
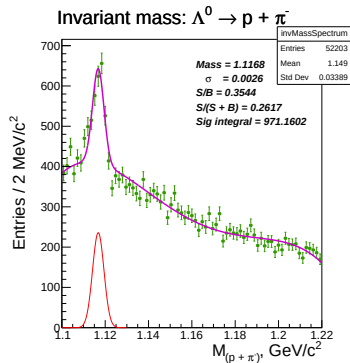
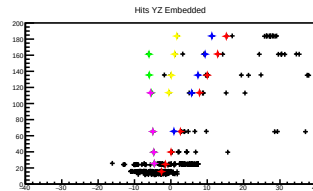
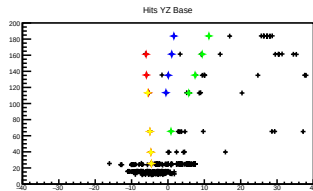
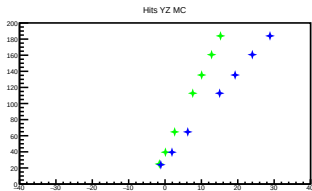
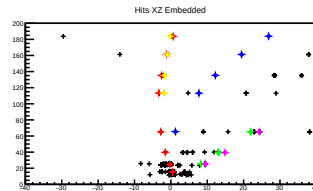
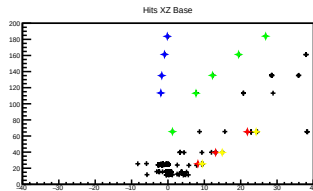
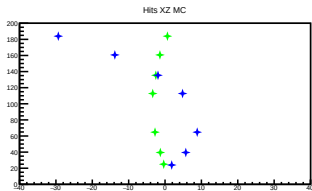


Figure: Exp Mass:Path distribution

Cut selection



Track finder



GEM HitMaker Efficiency Test

MC only

	BigZone	HotZone
Station = 0 iMod = 0	0.975684	0.989266
iMod = 1	0.884250	0.982759
Station = 1 iMod = 0	0.966203	0.988338
iMod = 1	0.794201	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	0.956806
iMod = 1	0.799820	0.947141
Station = 5 iMod = 0	0.964614	0.972973
iMod = 1	0.942036	0.964838

Embedded

	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