Associating CalMip and Track Variables

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Outlook

• The second part of the study concerns Mip reconstructed directions
  
  – consistency check

  – correlation with the Mip segment length

  – comparison to the Track directions

All plots refer to following cuts
  » TkrNumTracks = 1
  » CalMipNum > 0
CalMip Position

TkrNumTracks=1
CalMipNum > 0

All 1 Track Events

On Axis Events
VtxZDir<-0.9 (25.8 deg)

On Axis events have more homogeneous CalMip1Pos distribution
Mip direction and segment length

CalMip1Dir(Z)

Cal thickness ~160 mm
(8×1Layer = 8×20 mm)

At least 3 layers

Try to understand the meaning of second peak in the next slides

CalMip1ArcLen

CAL thickness

TkrNumTracks=1
CalMipNum > 0
Mip Finder requires:
• XtalEnergy > 8 MeV
• NLayers >= 3

The plot structure reflects the number of CAL layers crossed by the MIP (see next slide)
CalMip1Dir(Z) vs CalMip1ArcLen (I I)

Energy deposition > 8 MeV in 8 Layers

Energy deposition > 8 MeV in only 6 Layers

Mip Finder requires:
• XtalEnergy > 8 MeV
• NLayers >= 3

TkrNumTracks=1
CalMipNum > 0
Investigating long Mip segments

Energy deposition $> 8$ MeV in Layers $0 \rightarrow 7$

We understand correlation between Mip direction and arc length but

Why so many “green” MIPs?
Look at MIP segment direction

CalMip1Dir(X)

CalMip1Dir(Y)

CalMip1Dir(Z)

On Axis Tracks

second peak

Fred please cross check!

TkruNumTracks=1 CalMipNum > 0
Correlating CAL and Track

CAL: CalMip1Dir(X,Y,Z)
Track: Vtx(X,Y,Z)Dir

X Dir

Y Dir

Z Dir

MIP finder well correlated to reconstructed track

but........
CalMip1Dir vs Tkr1EndDir

CAL: CalMip1Dir(X,Y,Z)
Track: Tkr1EndDir(X,Y,Z)

X Dir

CAL

Track

Z Dir

CAL

Track

Beware of different orientation for initial (Vtx) and final (Tkr) Track direction
Conclusions

• Mip direction is well correlated to Track direction as expected

• We have still to understand better the peaks in the Mip Direction distributions (X,Y,Z)  
  – maybe they reflect the Cal Layer geometry?
Summary of CalMip SVAC variables

- Analyzed
  - CalMipNum
  - CalMipnPos(3) \( n=1,2 \)
  - CalMipnDir(3)
  - CalMipnChi2
  - CalMipnArcLen
  - CalMipnEcor
  - CalMipnErm

- Not yet checked
  - CalMipnD2edge
  - CalMipnEcorRms

Thanks Frederic for useful explanations!!

We are waiting for real data!!