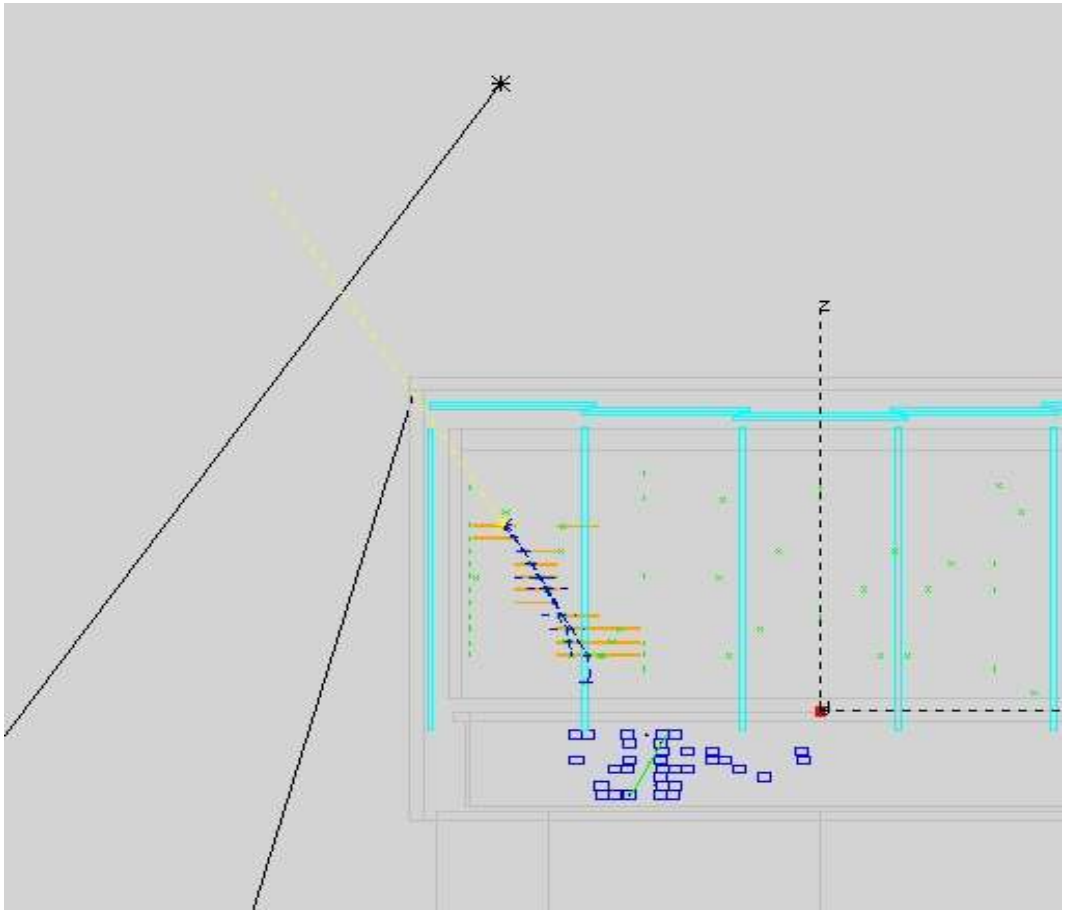
Residual Background events after Rejection Cuts

119.6 M total background events (GlastReleasev3r3p7)

344 residual events after Bill's rejection cuts.

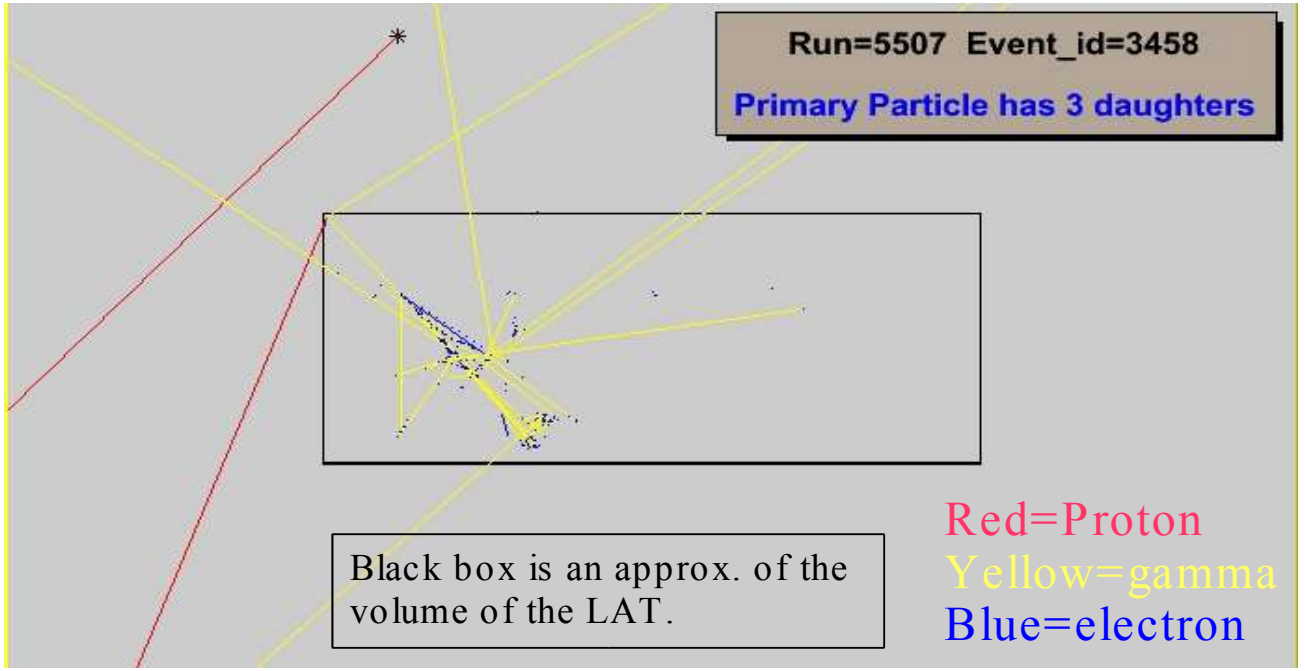
342 events were studied using the gui, MeritTuple and Mc Root Data. (The other 2 events are missing because the corresponding root files are corrupt).

Surprise... (~36 events like this one)

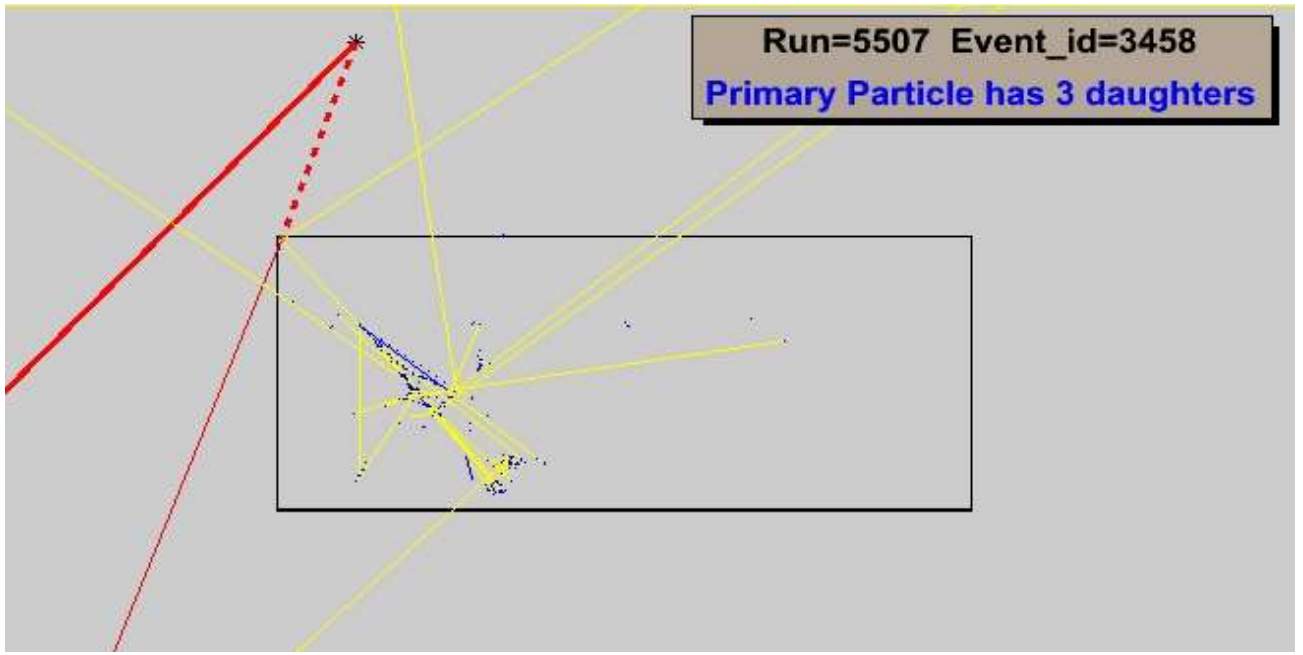


Preliminary analysis indicates that displayed primary particle is not consistent with McXDir, McYDir, McZDir from ntuple.

From Mc Root File: (this is the complete Mc tree, no "pruning" was done, Heather made a special run of this event)

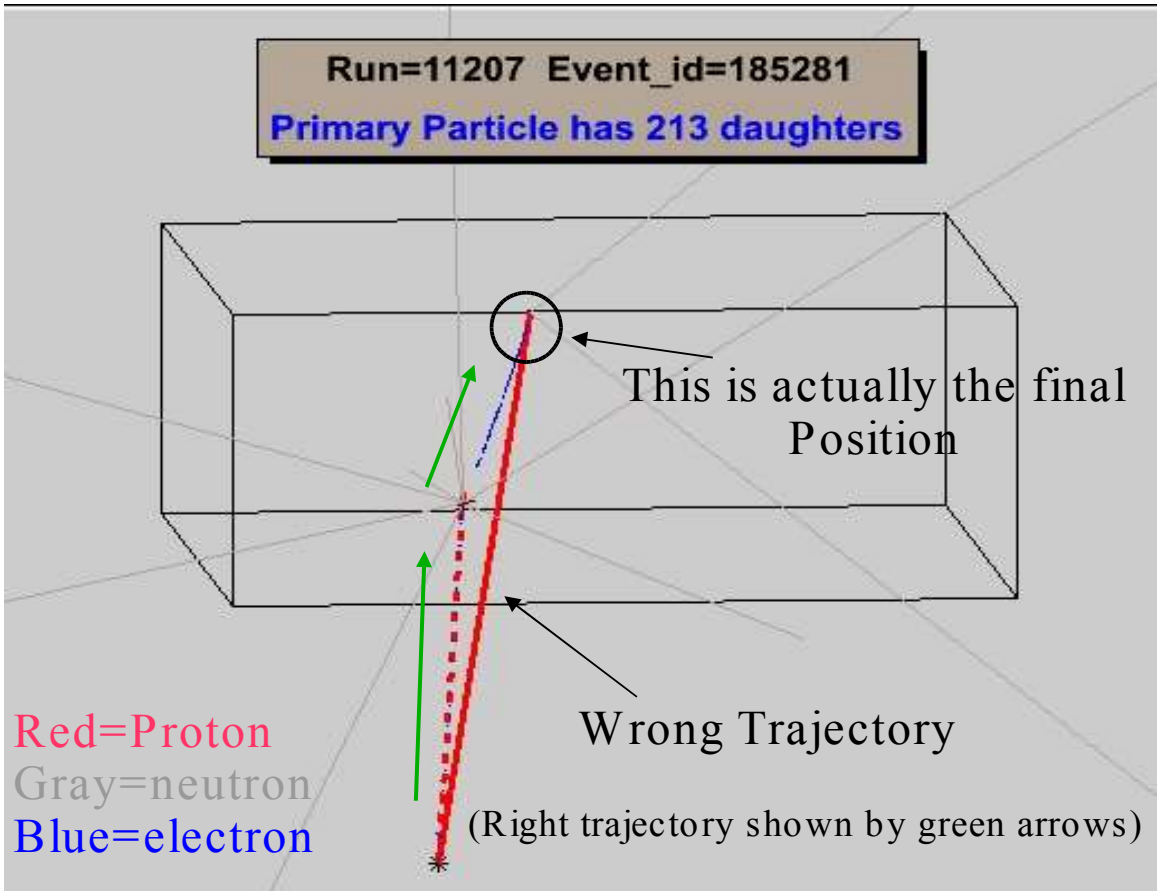


Lines are drawn using the initial and final position from Mc File



Dashed line is based on initial momentum from Mc File. Consistent with McXDir,...

The bug is not always senseless...



Conclusions:

The algorithm to write the final position is messing up (~85 events) when the primary particle is interacting but not losing its identity.

It's not a good idea to draw the primary particle using the final position only, the particle can be scattering in between.

Calculating the Background Rate

A background average rate of 4.2 Khz/m^2 was assumed.

4.2 KHz / m^2 * 6 m^2 = 25.2 KHz picked up by Glast

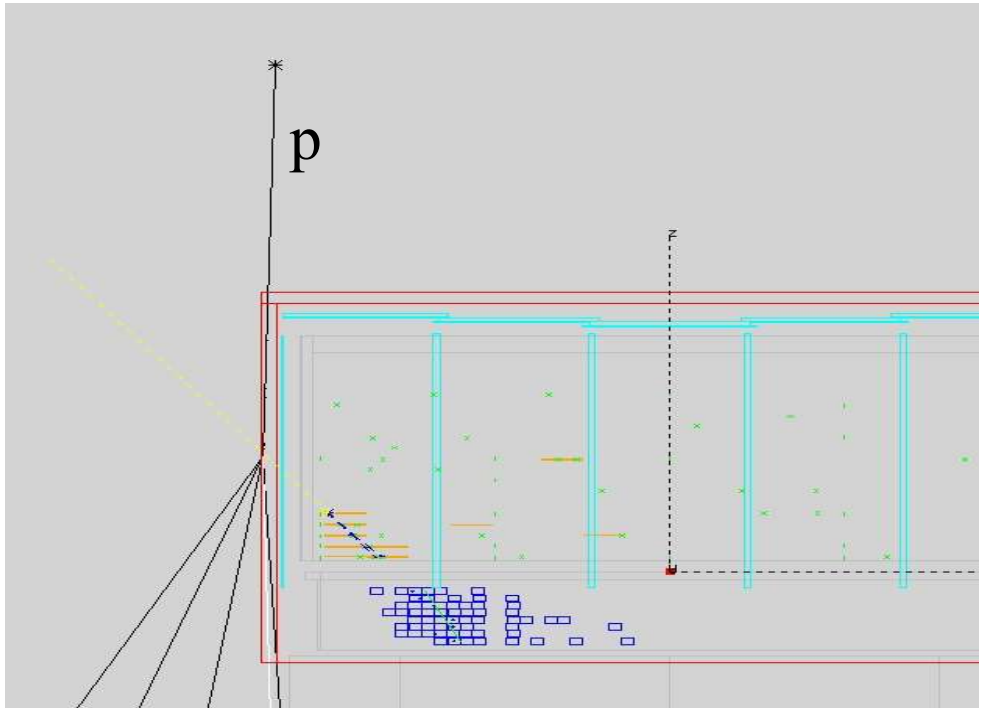
↓

119.6M events correspond to an elapsed time of 4746.03 s

↓

344 events / 4746.03 s = 0.0725 Hz

Interactions in the Blanket



Protons scatter inelastically from the blanket. We get backgrounds when the particles thrown in the tracker direction are neutral and there no ACD hits.

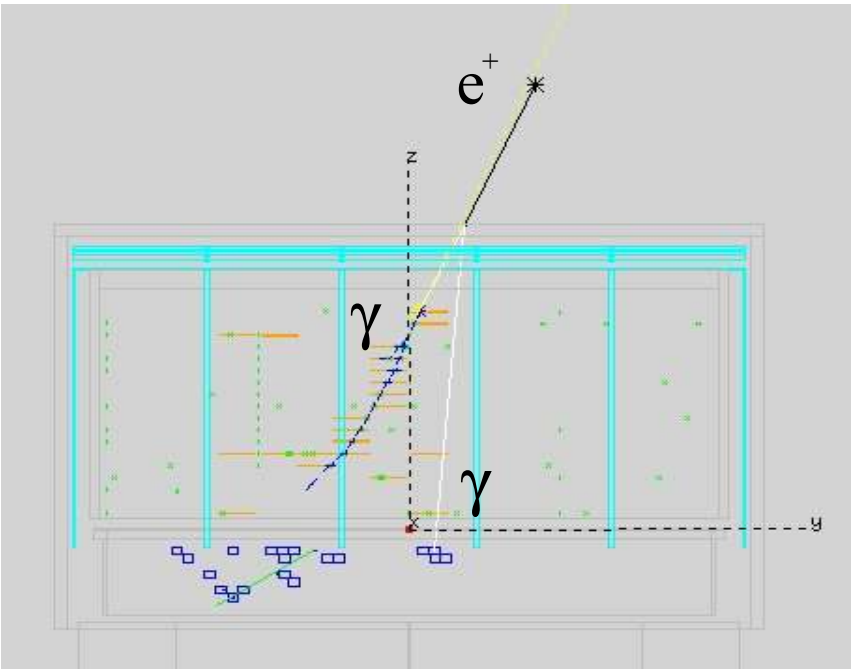
50 events (15%)

0.0105 Hz

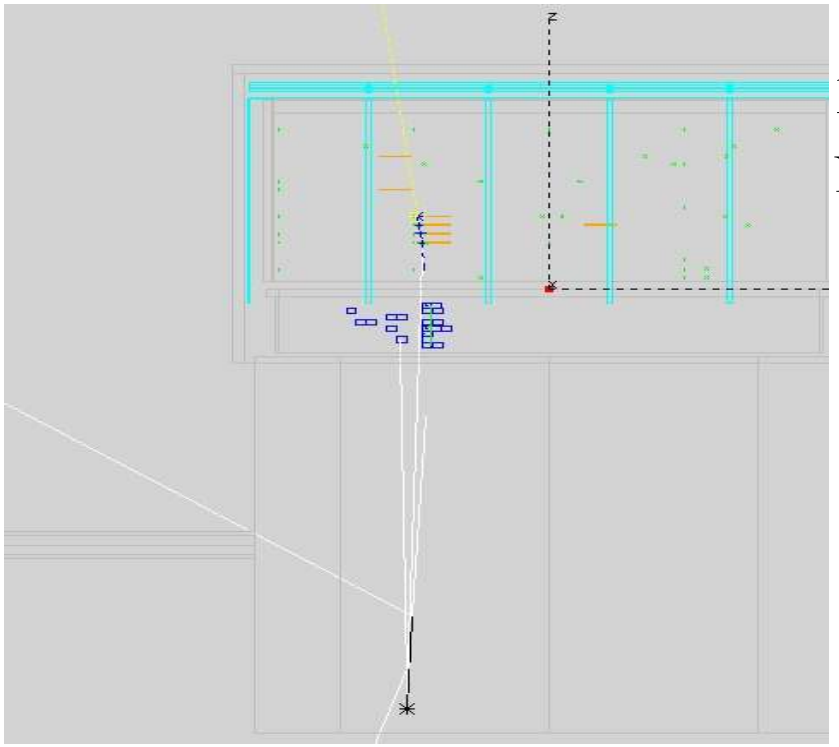
Positrons with energies around 150 MeV annihilate producing two gammas.

39 events (11%)

0.0082 Hz



Hadron Showers



p->X in spacecraft or Cal

No clear MIP signature.

Extra activity in Tkr may be useful.

CAL pattern?

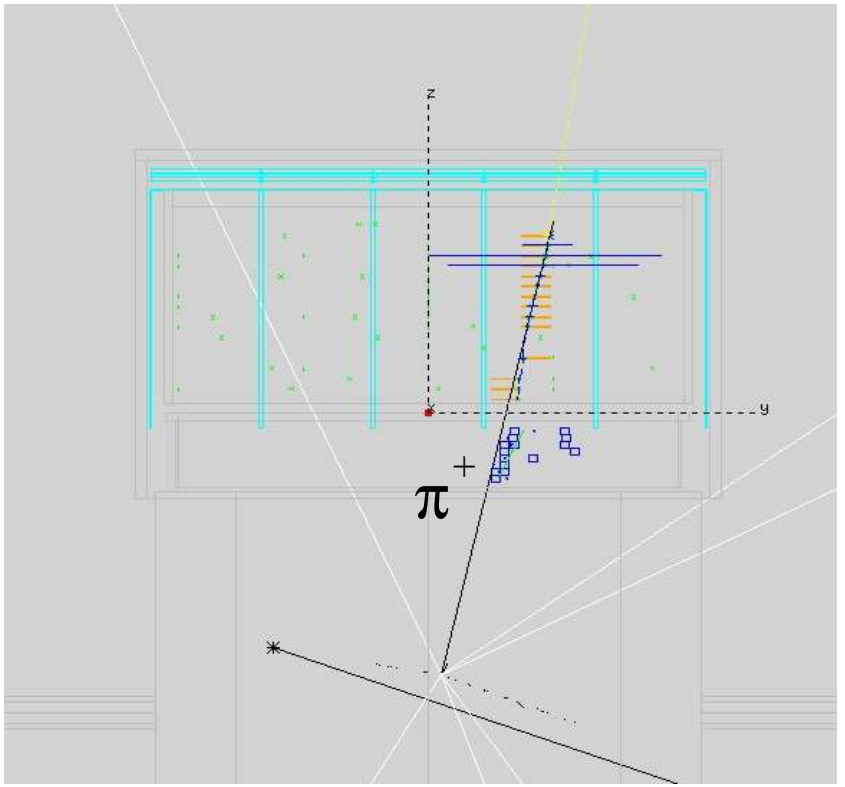
70 events (20%)

0.0147 Hz

Same as above but either the primary particle or one of the daughters leaves a MIP signature in the CAL.

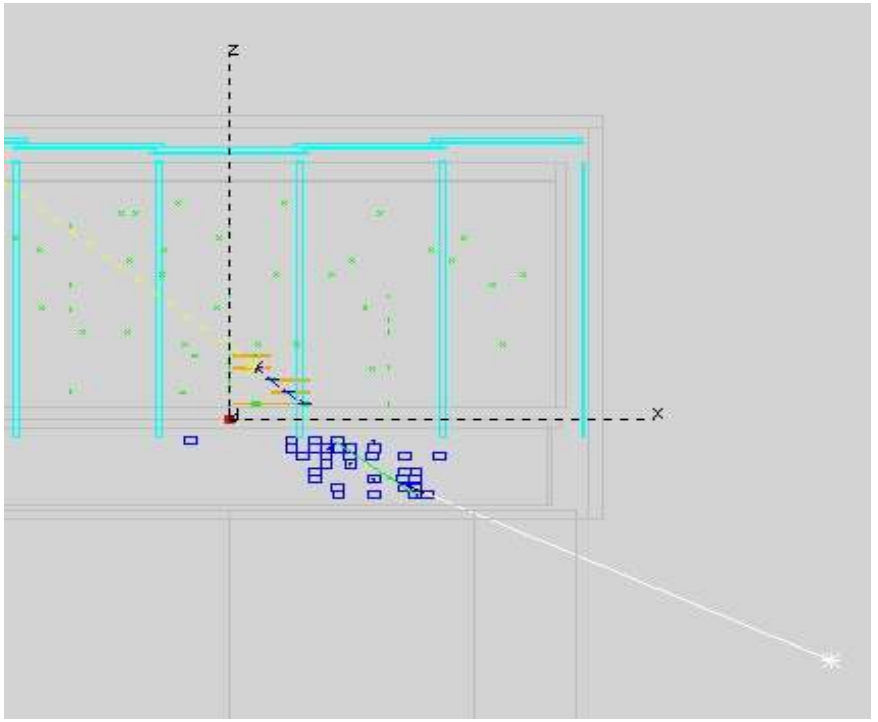
64 events (19%)

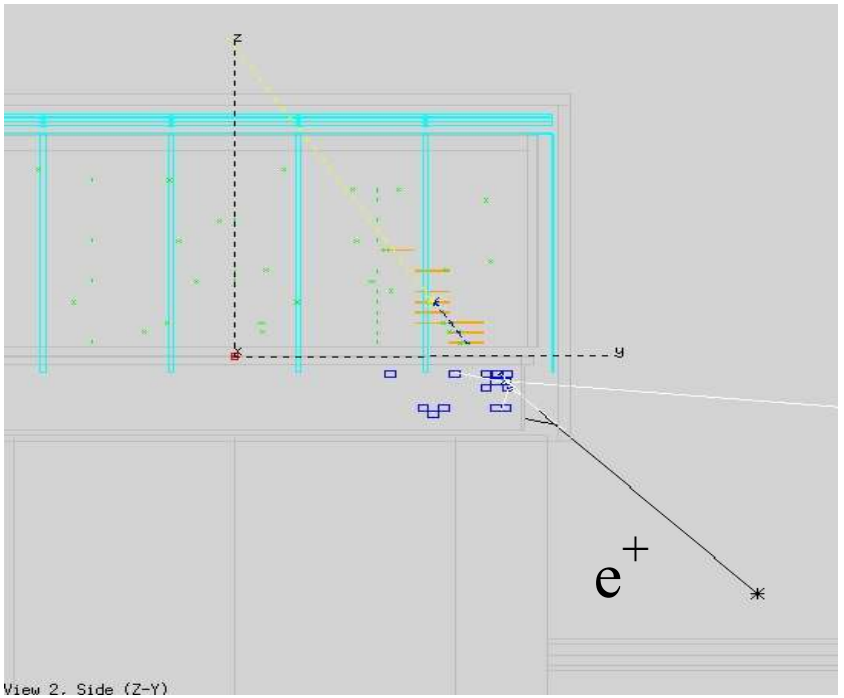
0.0135 Hz



Albedo Gammas

35 events (10%)
0.0074 Hz



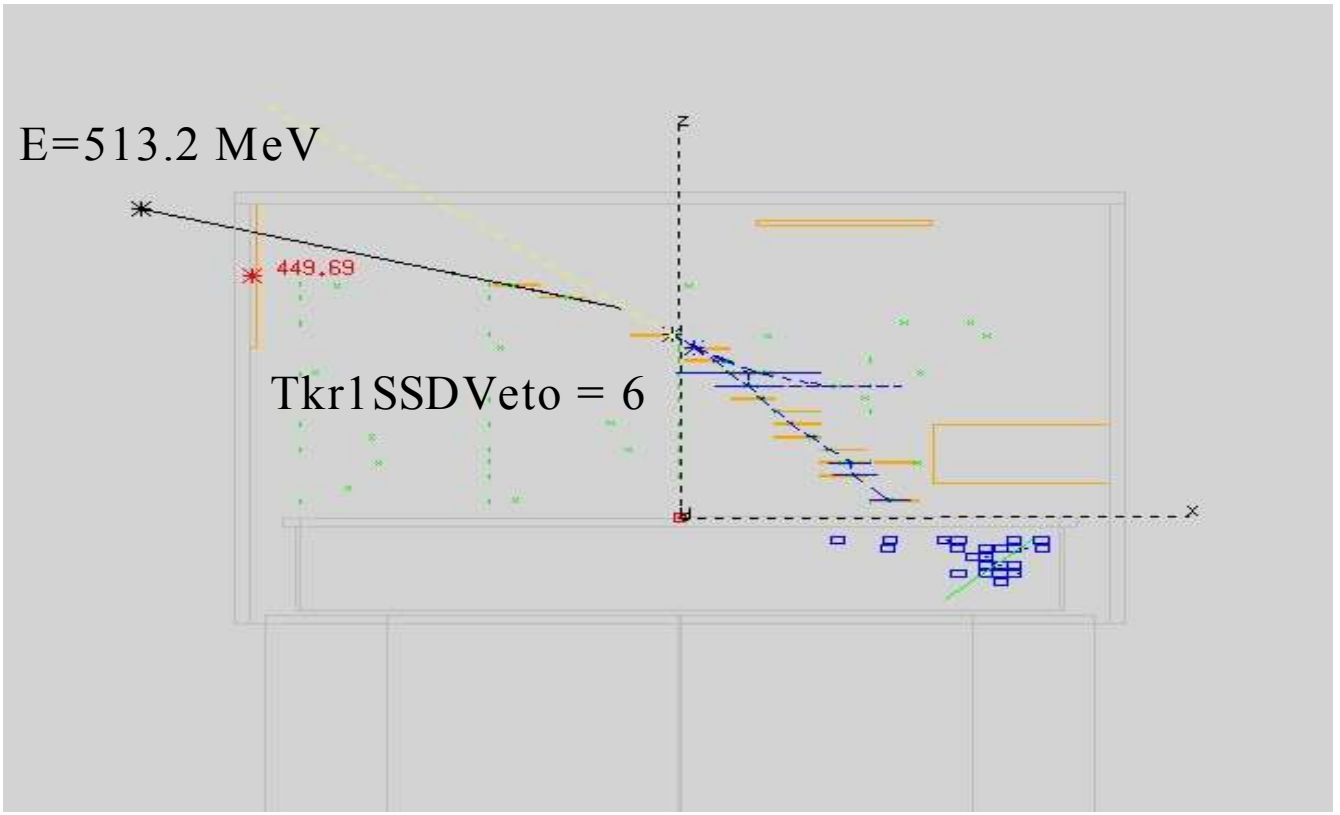


e^+ interactions

Take place at the spacecraft or CAL

33 events (10%)
0.0070 Hz

Tkr1SSDVeto Criteria



Events where the ACD was fired up are allowed with the condition that Tkr1SSDVeto>2 (so that backsplash gammas are kept).

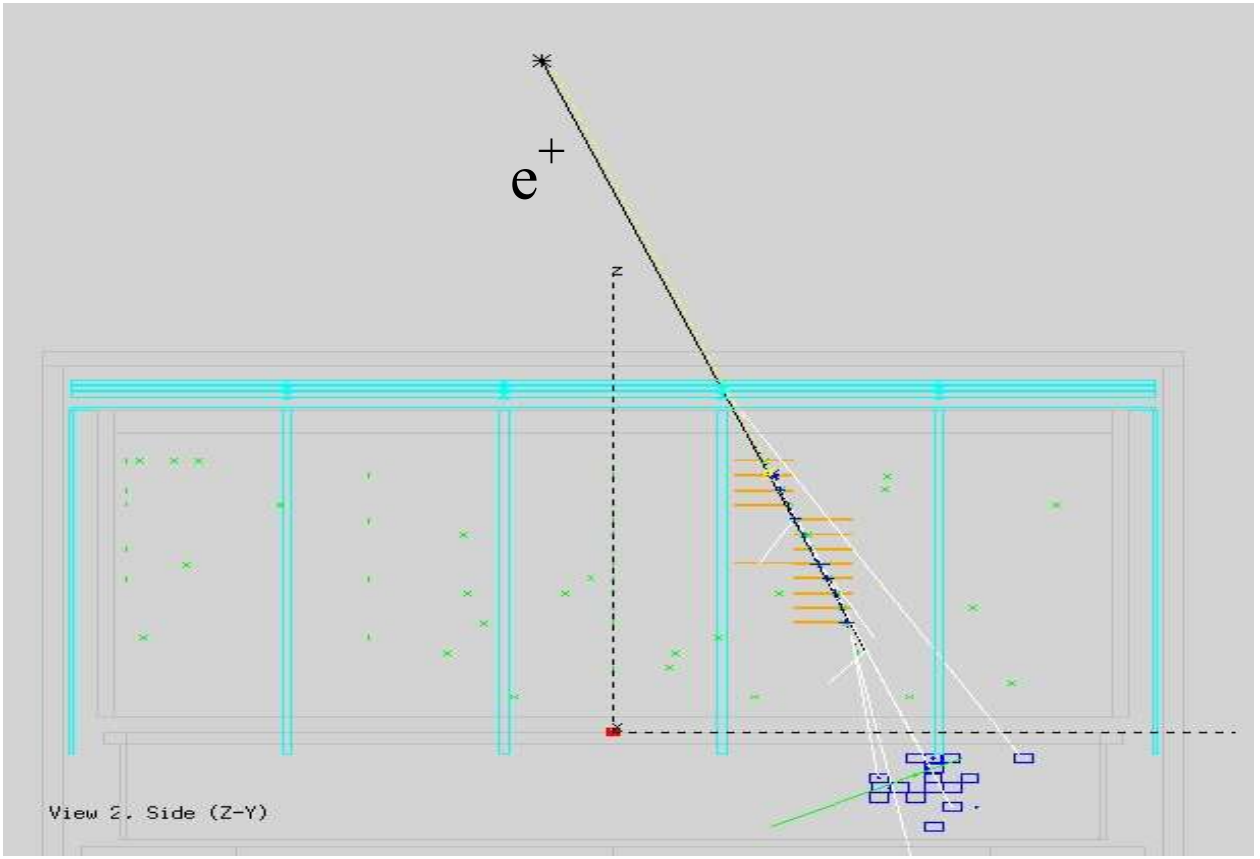
However, the track might be pointing to the wrong tile.

22 events (6%)

0.0046 Hz

Tkr1SSDVeto≡ # of live SSD back along trajectory from start of first track to ACD

ACD Cracks



10 events are protons (3%) 0.0021 Hz
19 events are e, e^+ (6%) 0.0040 Hz

In some occasions a tile is marginally hit in the gui but no ActDist is calculated. Reducing the threshold may get some of these events rejected.

Summary Table

Type	Percentage out of 342	Bgnd Rate
Blanket (p)	15 %	0.0105 Hz
Blanket (e)	11 %	0.0082 Hz
Hadron Shower	20 %	0.0147 Hz
Hadron Shower with MIP	19 %	0.0135 Hz
e Interactions	10 %	0.0070Hz
TkrSSDVeto Criteria	6 %	0.0046 Hz
Acd Crack (p)	3 %	0.0021 Hz
Acd Crack (e)	6 %	0.0040 Hz
Albedo Gamma	10 %	0.0074 Hz