

## MAUS - Feature #1946

### Track matching with diffuser

10 November 2017 10:23 - Rogers, Chris

<b>Status:</b>	Rejected	<b>Start date:</b>	10 November 2017
<b>Priority:</b>	Normal	<b>Due date:</b>	
<b>Assignee:</b>	Rogers, Chris	<b>% Done:</b>	0%
<b>Category:</b>	Global Reconstruction	<b>Estimated time:</b>	0.00 hour
<b>Target version:</b>	Future MAUS release		
<b>Workflow:</b>	New Issue		
<b>Description</b>			
Turns out the track matching with diffuser yields a very different residual width as compared to track matching without diffuser... making position cut not really useful with diffuser. How do we handle the cuts in this case?			

### History

#### #1 - 10 November 2017 10:29 - Rogers, Chris

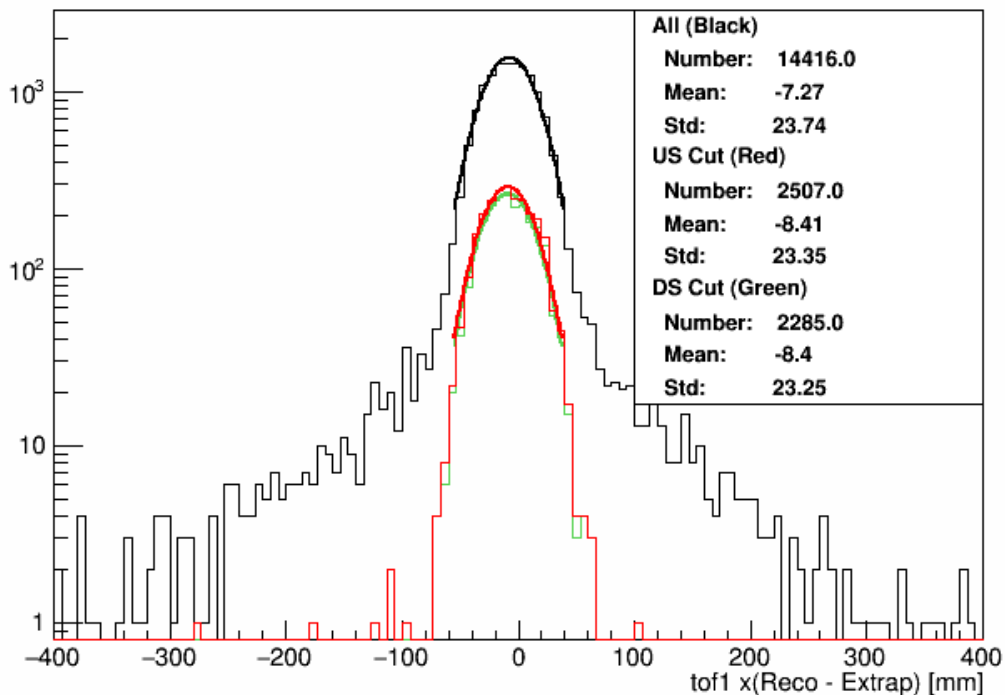
Looking at data with the diffuser in, the width of the residual distribution at TOF1 looks pretty broad (100 mm RMS). Obviously the diffuser makes a huge amount of scattering. But this means that the track matching cut is far too tight.

Consider attached plots - I show the residuals distribution for

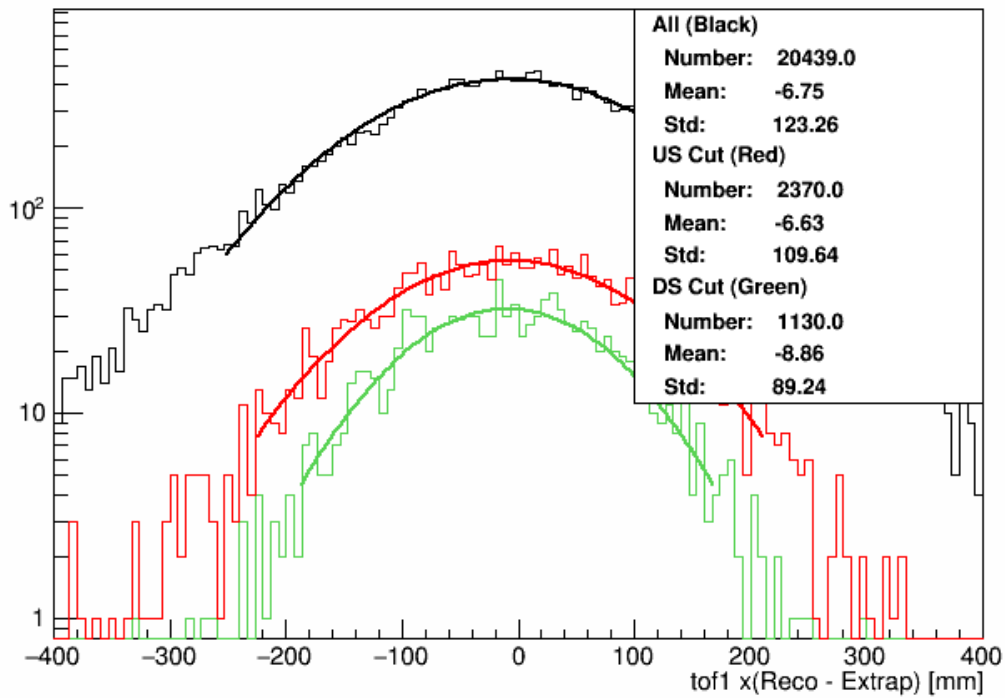
- run 8681, which has no diffuser (3-140 beamline, 2016/04 1.2 cooling channel with 3 T in SSU).
- run 8645, which has the full diffuser (10-140 beamline, 2016/04 1.2 cooling channel with 3 T in SSU).

To generate these plots, I opened the TOF1 position cut right up when running global recon.

#### 3-140-8681



## 10-140-8645



The red histogram are events that I consider to be "good", i.e. TOF and TKU are consistent as muons,  $\chi^2$  in TKU is good and there is only evidence of one particle in TKU and TOF0/1.

The difference in width of the residuals is pretty clear. By default track matching uses a cut at 60 mm, which rejects many "good" tracks when diffuser is in. In the first instance, I propose opening the track matching cut right up so that the algorithm can be used at all when diffuser is in the beamline. Then analysts can make a run-by-run decision on which tracks to accept in post-processing.

One could imagine, in the future, propagating the uncertainties. That is probably a bigger job (though many elements of the code are in place, it will require some reasonably substantive changes).

Thoughts? Comments?

### #2 - 10 November 2017 11:07 - Rogers, Chris

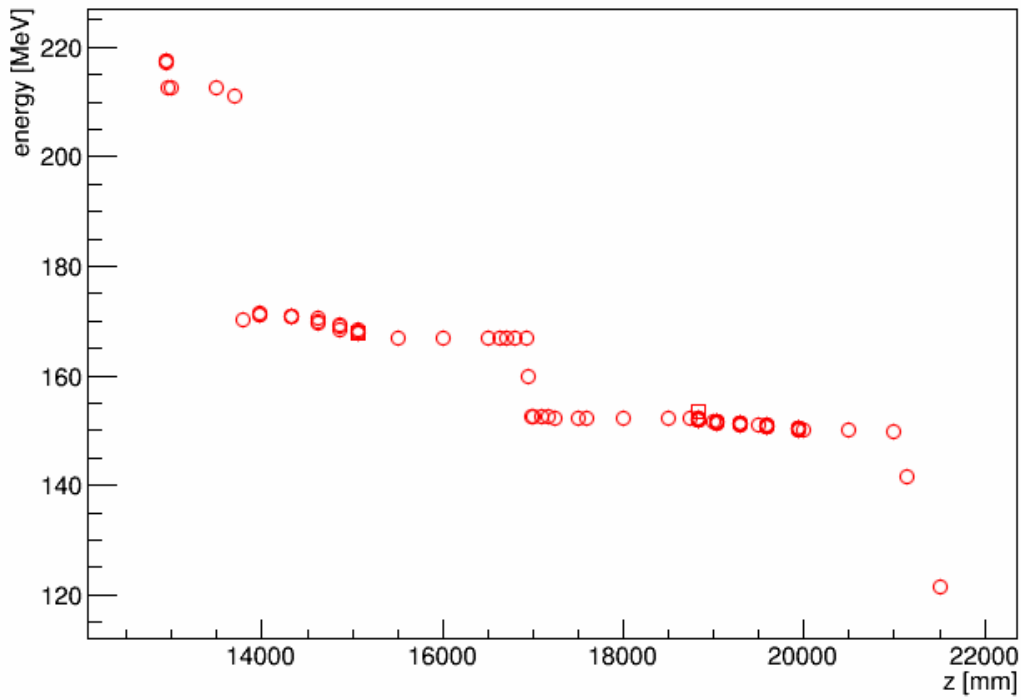
- File *event\_display\_1\_energy.png* added

- File *event\_display\_2\_energy.png* added

- File *event\_display\_3\_energy.png* added

Attached a few "event displays" showing energy vs z for the extrapolated track; e.g.

## 10-140-8645



Just checking I didn't do anything dumb like making energy go down instead of up through diffuser etc...

### #3 - 10 May 2018 16:08 - Rogers, Chris

- Status changed from Open to Rejected

Won't fix for now; just note that track matching doesn't really make sense with diffuser closed

### Files

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2016-04_1.2_globals.tar.gz	16.7 MB	10 November 2017	Rogers, Chris
8645_residual_tof1_x.png	15.4 KB	10 November 2017	Rogers, Chris
8681_residual_tof1_x.png	14.5 KB	10 November 2017	Rogers, Chris
event_display_1_energy.png	13.4 KB	10 November 2017	Rogers, Chris
event_display_2_energy.png	13.4 KB	10 November 2017	Rogers, Chris
event_display_3_energy.png	13 KB	10 November 2017	Rogers, Chris