

Analysis - Bug #1972

Delta TOF01 Mystery

18 May 2018 11:12 - Rogers, Chris

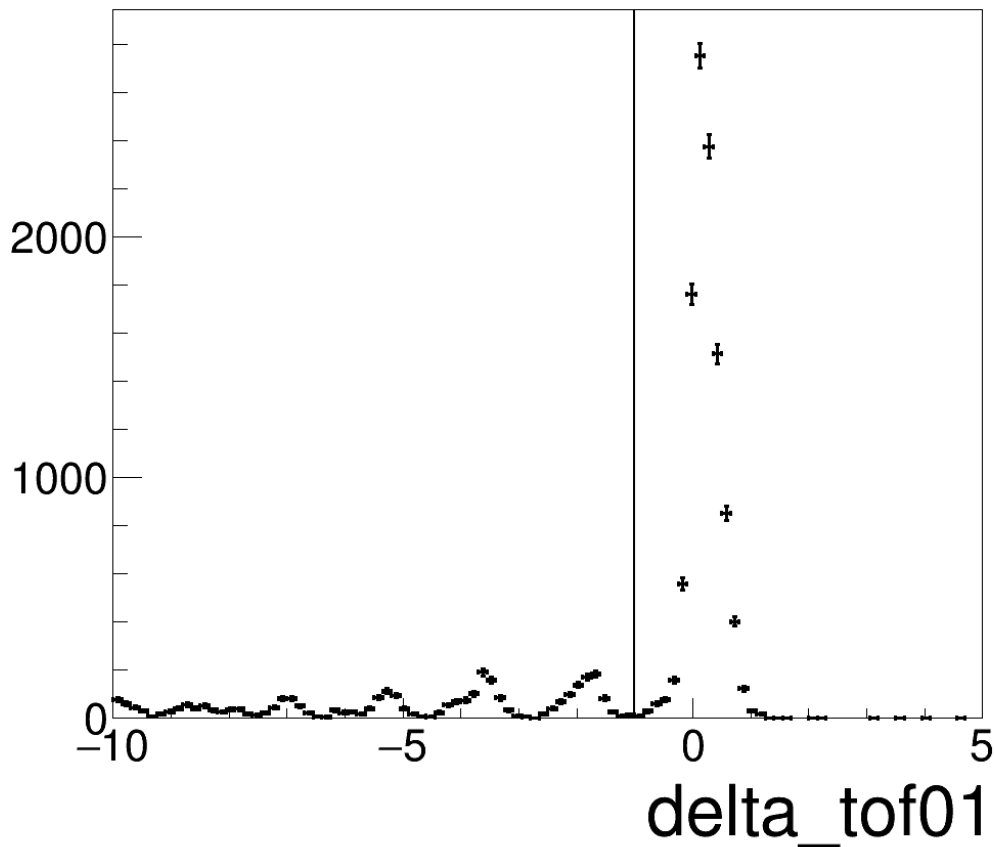
Status: Open	Start date: 18 May 2018
Priority: Normal	Due date:
Assignee:	% Done: 0%
Category:	Estimated time: 0.00 hour
Target version:	
Description Digging into the mysterious delta TOF01 feature...	

History

#1 - 18 May 2018 11:44 - Rogers, Chris

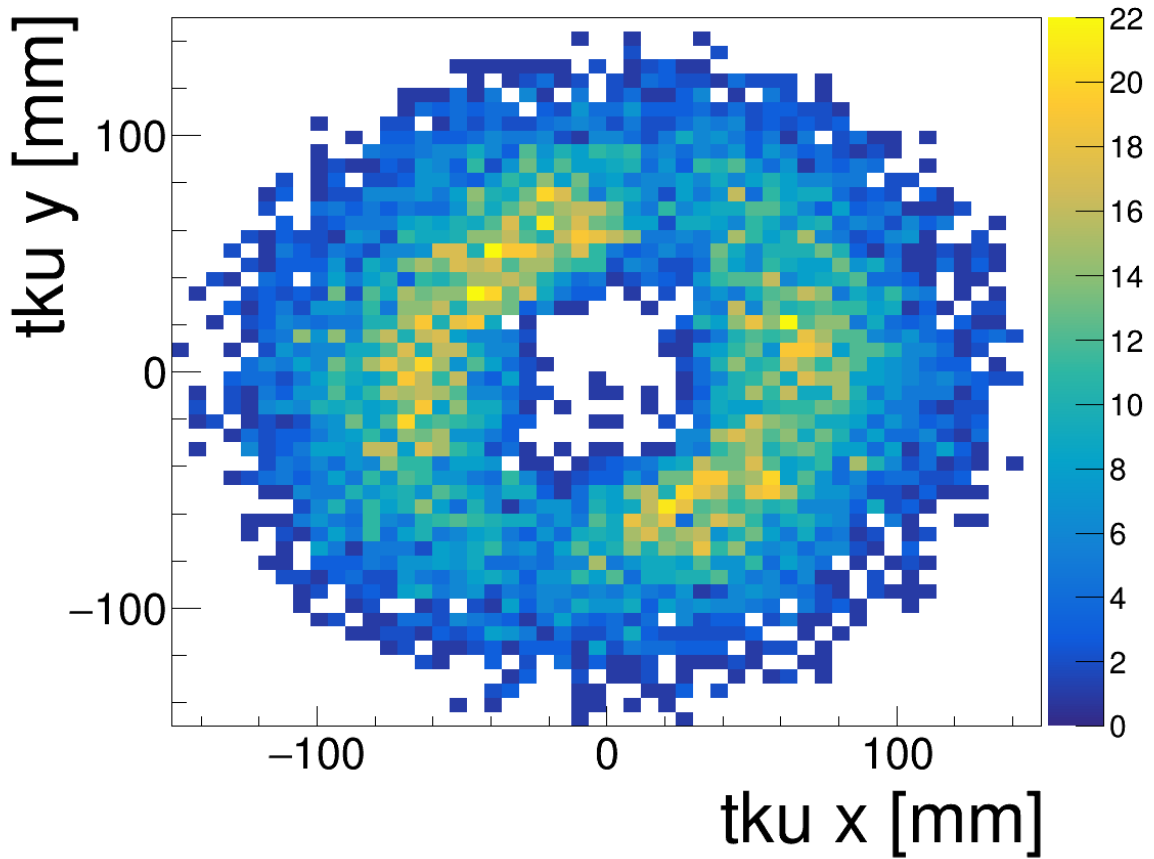
I have been digging into the mysterious delta TOF01 feature; that is, when comparing the TOF for the extrapolated track from TKU between TOF1 and TOF0, I see a weird discrepancy between the measured TOF01 and extrapolated TOF01 for some tracks:

2017-2.7 10-140 None



The periodic structure in the negative direction looks weird. So I changed my cut to select only those tracks in the weird periodic structure delta TOF01 < -1.5 ns. The events look very typical except for the position in TKU, where we get a nice doughnut shape:

2017-2.7 10-140 None



Yum. So these are high radius tracks being mis-reconstructed as having momentum between 135 - 145 MeV/c. I plot measured TOF01 - extrapolated TOF01; so the extrapolated TOF01 is too large, i.e. they are reconstructed with too large a momentum. We have peaks in delta TOF01 like:

Peak	0	-1.7	-3.6	-5.3	-6.2 maybe	-7.0	-8.4 maybe	-8.7
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and so on up to about -20 ns. I think there is a reasonable case for peaks every 1.7 ns or so. The muon peak is at 3.2 ns relative to the electron peak, which is 28.6 ns absolute. So we can calculate the equivalent momenta between TOF01, which are listed below:

0	28.6	207.0
-1.7	30.3	164.0
-3.6	32.2	137.0
-5.3	33.9	120.0
-7.0	35.6	108.0
-8.7	37.3	99.0

Not sure how auspicious or otherwise these momenta are. They don't look "special"...

#2 - 18 May 2018 14:49 - Rogers, Chris

Thinking more - I wonder if it is the track extrapolation at fault rather than tracker reconstruction? These tracks pass the TOF and tracker p cuts, so they are consistent from that POV... more digging methinks...

Files

plots_2017-2.7_10-140_None.tar.gz	32 MB	18 May 2018	Rogers, Chris
global_through_residual_tof0_t.png	37.1 KB	18 May 2018	Rogers, Chris
tof_delta_tof01_9_0.png	15.9 KB	18 May 2018	Rogers, Chris
tku_x_tku_y_us_cut.png	28.7 KB	18 May 2018	Rogers, Chris