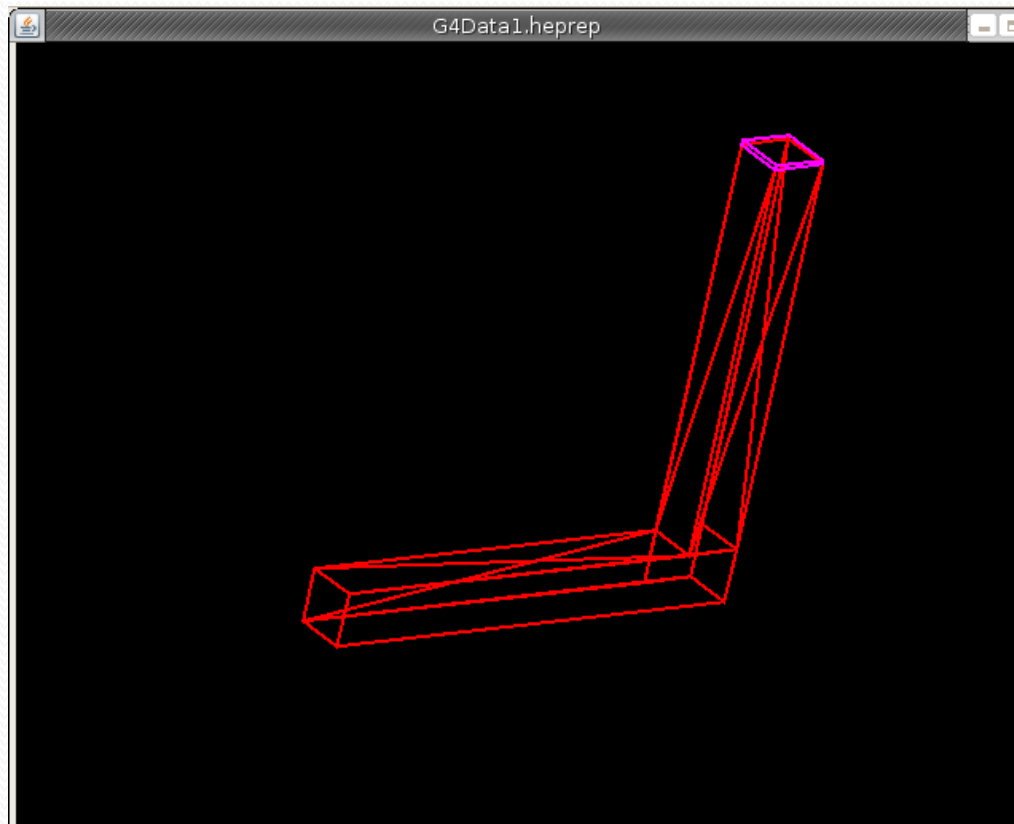# Cherenkov Fast Timing Detectors

Weekly update 07/15/11
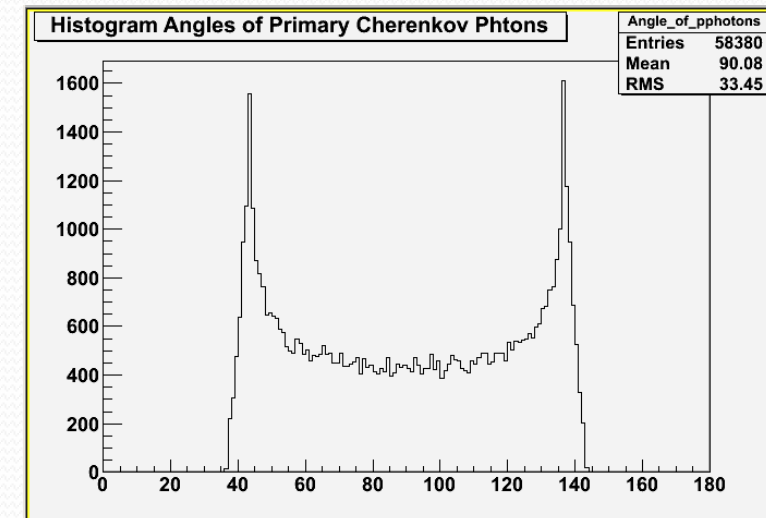Chris Nicholson
Supervisor: Mike Albrow
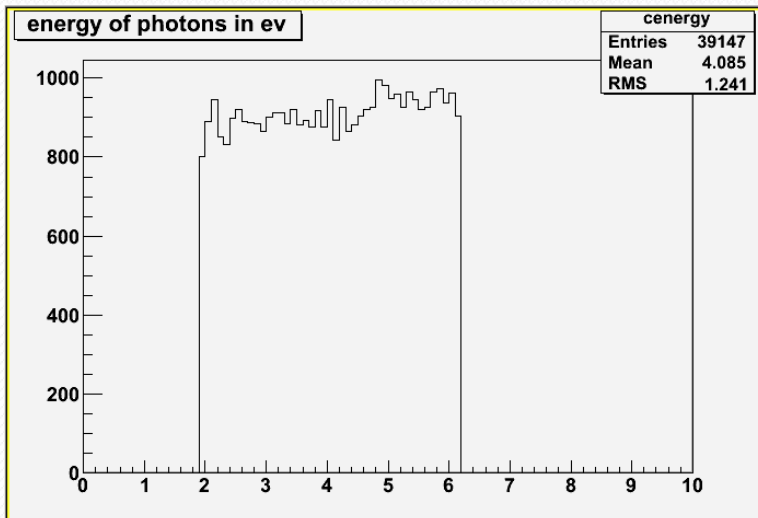
Goals from last week

- Finish L-bar construction
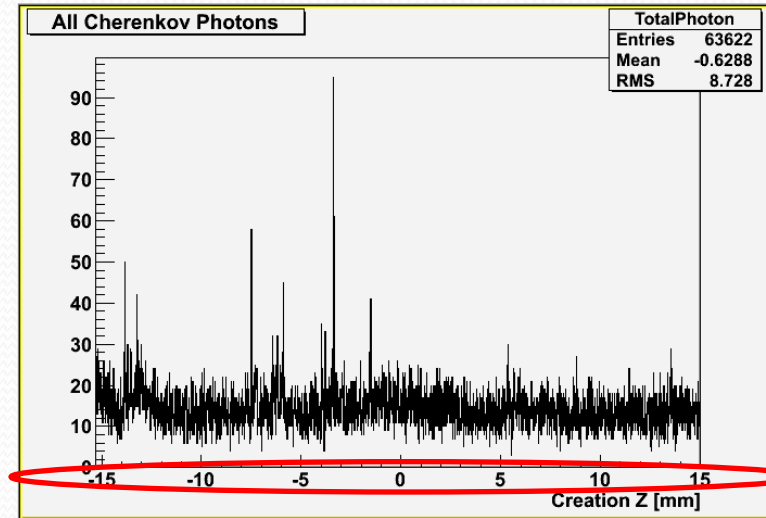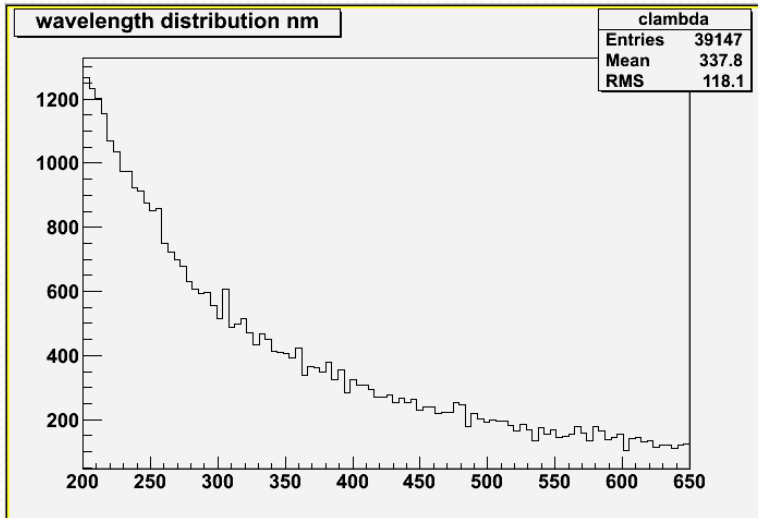
- (Visualisation of geometry with light rays)

- Run root analysis investigation of properties

- Analysis of time resolutions of test beam data

- (Pulse height analysis)

L-bar Construction

- 25mm long x 25mm high; 3mm x 3mm wide

- SiPM at top

- One question: is "sensitve detector" at same position as SiPM? Some graphical outputs suggest a problem…

Geant4 Basic Characterisation

Analysis Graphs

Photon Wavelength

wavelength	
Entries	14
Mean	524.9
RMS	106.3

Average Time of Arrival vs. Wavelength of Photons at Detector

PPLambda	
Entries	7
Mean	524.9
Mean y	464.6
RMS	106.3
RMS y	33.33
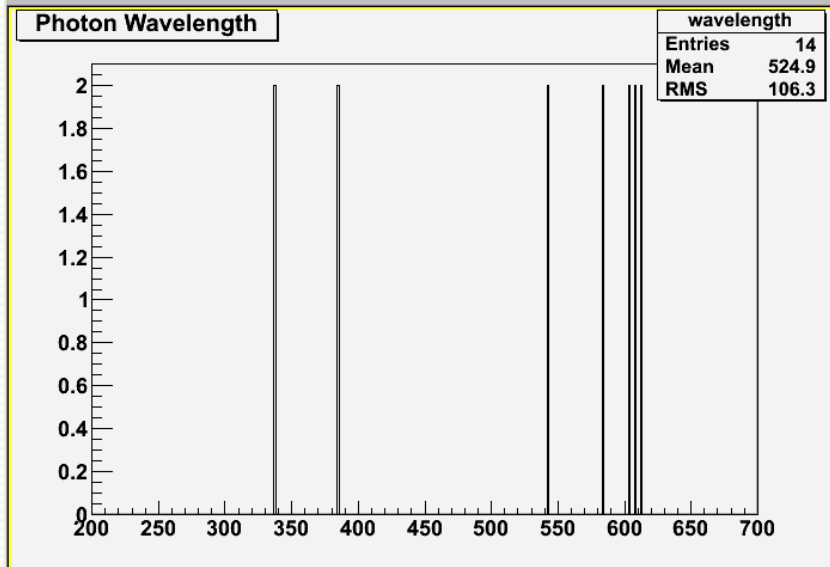
Worries:
- a number of graphs are empty
- Many have only a few entries
- Runs very slowly compared with old code
- Is this really working?

Test Beam Analysis

- Graphs have x-axis in nanoseconds
- Compared resolution between all channels
- Reference channel is Photek 240
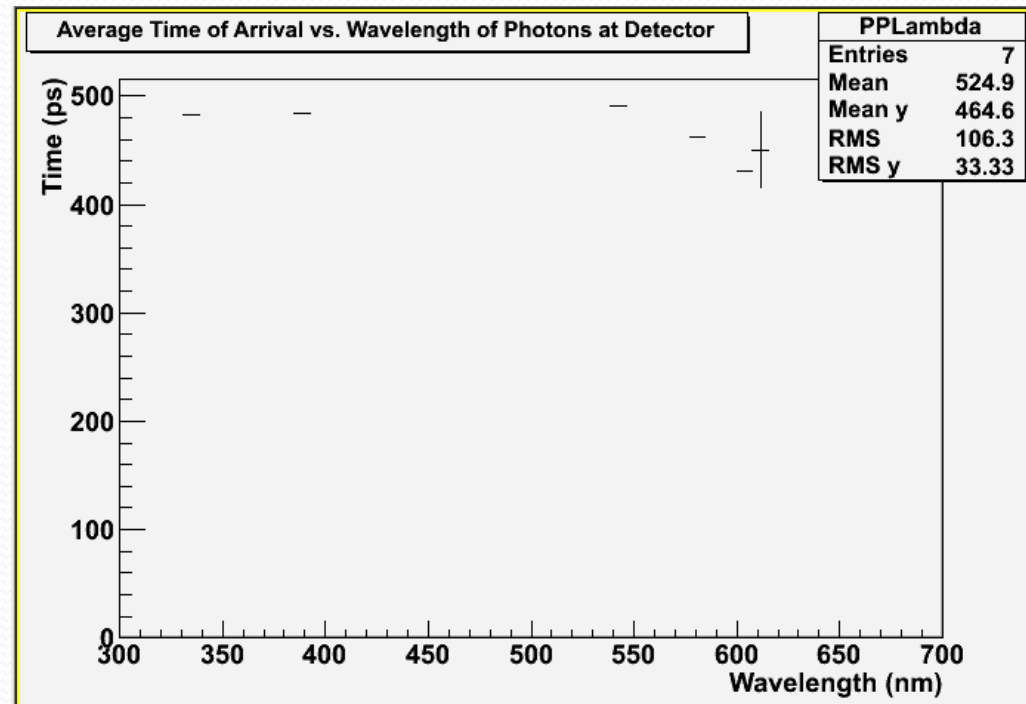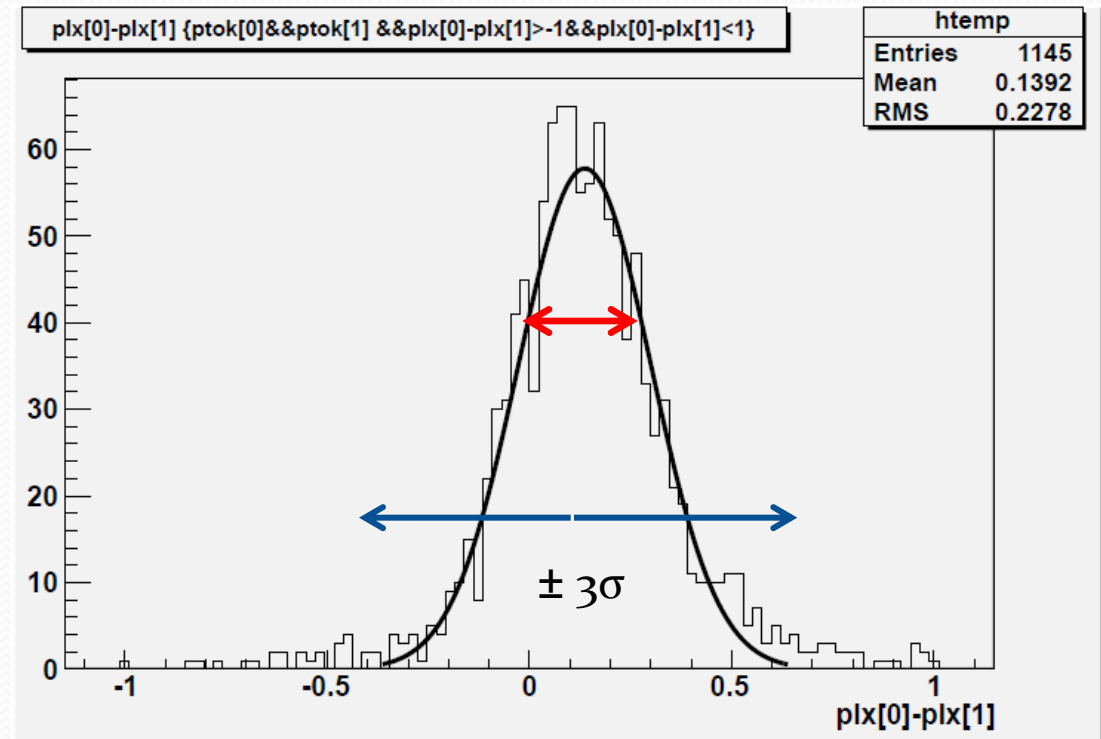- Sigma taken from data of 3sigma of full data range

Distribution of time differences between channels 0 and 1.

Spreadsheet of time differences between channels

	0	1	2	3	4	5	6
0							
1	0.1681 +/- 0.0049						
2	0.1661+/- 0.0052	0.1599 +/- 0.0047					
3	0.1247 +/- 0.0041	0.1115 +/- 0.0029	0.1053 +/- 0.0028				
4	0.4608 +/- 0.0109	0.466 +/- 0.012	0.4616 +/- 0.0118	0.4475 +/- 0.0103			
5	0.4169 +/-0.0122	0.4069 +/- 0.0121	0.4111 +/- 0.0159	0.3906 +/- 0.0106	0.1128 +/- 0.0030		
6	0.4322 +/- 0.0093	0.4293 +/- 0.0109	0.4106 +/- 0.0103	0.4003 +/- 0.0085	0.1019 +/- 0.0023	0.05086 +/- 0.00135	
7	0.4377 +/- 0.0104	0.4258 +/- 0.0113	0.4076 +/- 0.0109	0.396 +/- 0.008	0.1067 +/- 0.0026		

all times in nano s
these are mixed values, individual values (1/sqrt2) * mixed

no graphs available for 5/7 or 6/7?

Channels 6 and 7 are reference Photek 240?

Aims for next week

- Be able to look at arrival time vs. wavelength for all photons in Geant4

- Start to optimise dimensions of bar

- Continue analysis of test beam data: tabulate time resolutions and run conditions