Beam Line: Beamline Positions - Full Field Map

Beam Positions for the full field map beam line.

This study is done with the fully mapped field from Mauricio, which is what I should have done the first time around.

1. In mysql database "hps_test":
   - update hps_beamline set magfield="no" where name = "ps_field";
   - update hps_beamline set magfield="pair_spect" where name = "ps_ecal_mother";
2. Confirm beam hits the targets.

Simulation Parameters

Magnets

Pair Spectrometer field: pair_spectrometer.dat location: 601 -150.00 150.00 cm 51 -25 25 cm 8.8485 0 45.7200 cm gauss

Frascati magnet field: frascati_magnet_I403.9.dat location: 53 -331.66 328.74 mm 5 -34 34 mm 0.0 0 -172.3898 cm T

Frascati magnet field: frascati_magnet_I403.9.dat location: 53 -331.66 328.74 mm 5 -34 34 mm 0.0 0 263.8298 cm T

Offset:

```
<detector name="ps_ecal_mother">
    <position x="88.485*mm"  y="0*cm"  z="0*cm"  /> -->
</detector>
<detector name="TargetContainer">
    <position x="-19.5*mm"  y="0*cm"  z="0*cm"  />
</detector>
```

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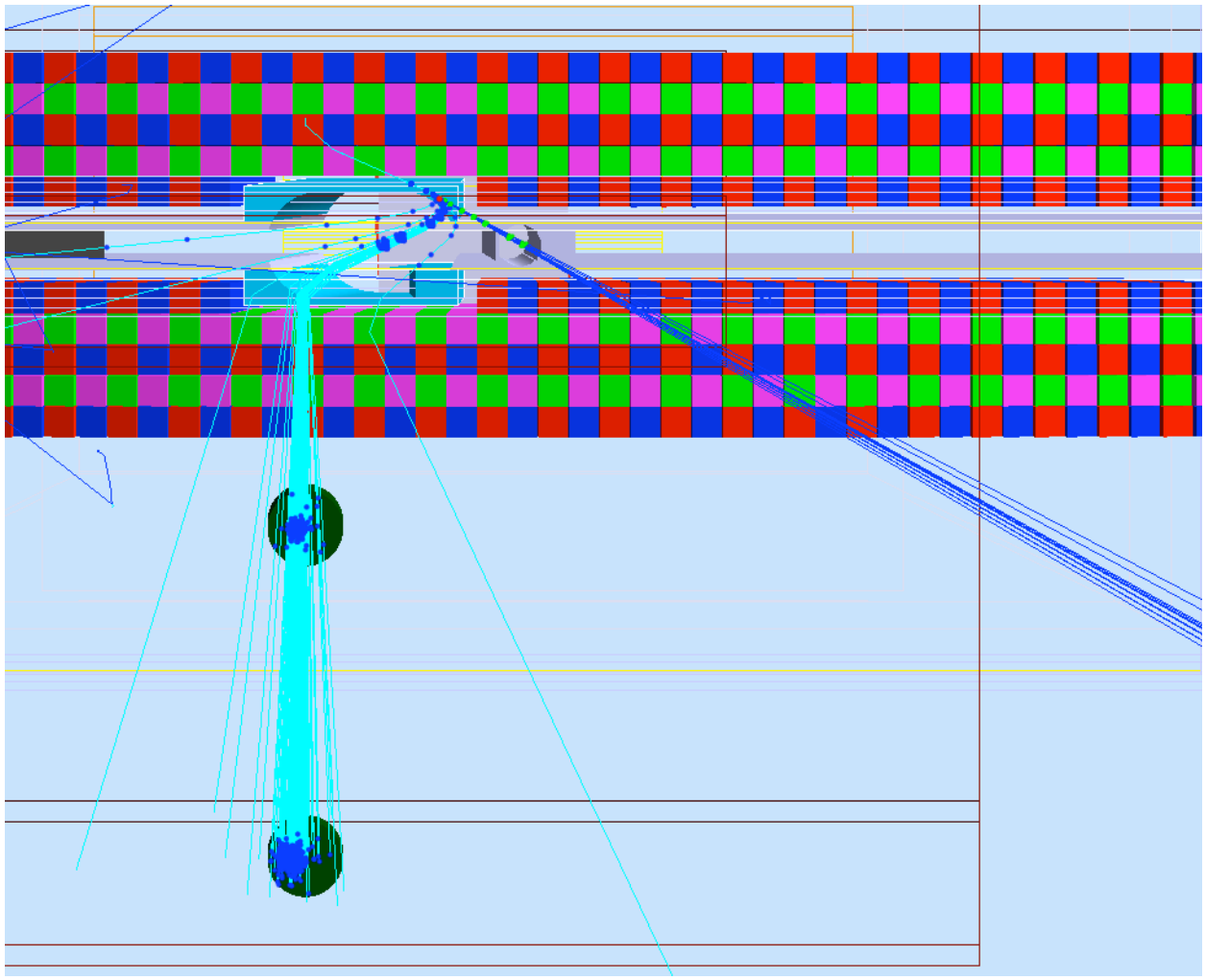

Table

Mapped Field
Results for Electron Beam

Name	Z Pos	X Pos	Local Z pos	Local X pos
A1 - 110	-314.2 mm	55.71 mm		-32.78 mm
A2 - 111	-100 mm	64.14 mm		-24.34 mm
B1 - 10 Target (+2 mm)	2 mm	67.37 mm		-21.12 mm
A3 - 112 Silicon 1	+100 mm	69.64 mm	-400 mm	-18.84 mm
A4 - 113 Silicon 2	+200 mm	71.48 mm	-300 mm	-17.1 mm
A5 - 114 Silicon 3	+300 mm	72.63 mm	-200 mm	-15.86 mm
A6 - 115 Silicon 4	+500 mm	73.22 mm	0 mm	-15.26 mm
A7 - 116 Silicon 5	+700 mm	71.10 mm	+200 mm	-17.38 mm
A8 - 117 Magnet Exit	+900.1 mm	66.29 mm	+400 mm	-22.20 mm
B3 - 12 Ecal Entry	1319 mm	50.64 mm		-37.84 mm
B4 - 13 Ecal Middle	1549 mm	41.54 mm	-135 mm	-45.27 mm

HPS Simulation

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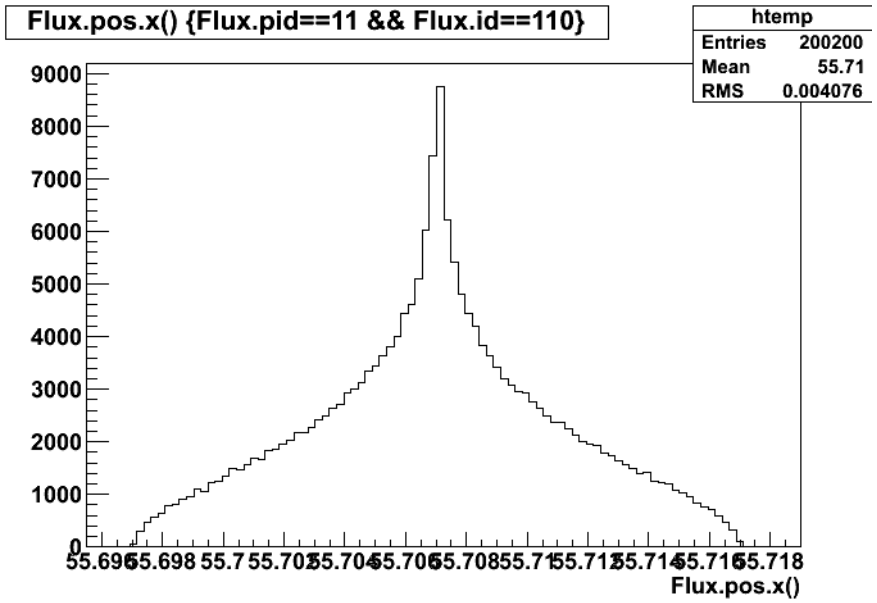
Results for Photon Beam

Name	Z Pos	X Pos	Local Z pos	Local X pos
A1 - 110	-314.2 mm	-		
A2 - 111	-100 mm	-		
B1 - 10 Target	0 mm	-		
A3 - 112 Silicon 1	+100 mm	70.36 mm	-400 mm	-18.12 mm
A4 - 113 Silicon 2	+200 mm	73.42 mm	-300 mm	-15.07 mm
A5 - 114 Silicon 3	+300 mm	76.47 mm	-200 mm	-12.02 mm
A6 - 115 Silicon 4	+500 mm	82.58 mm	0 mm	-5.91 mm
A7 - 116 Silicon 5	+700 mm	88.68 mm	+200 mm	0.194 mm
A8 - 117 Magnet exit	+900.1 mm	94.79 mm	+400 mm	6.303 mm
B3 - 12 Ecal Entry	1319 mm	107.6 mm		19.10 mm
B4 - 13 Ecal Middle	1549 mm	114.6 mm	-135 mm	26.11 mm

PLOTS

Selecting the electron (photon) specifically and setting a limit on the energy gives cleaner plots. The outliers on the locations after the target are low energy crap. The width of the distribution is caused by the spread in the vertex. Turning off this spread narrows the distribution.

With vertex spread (x,y) = (0.01,0.01)



Without vertex spread:

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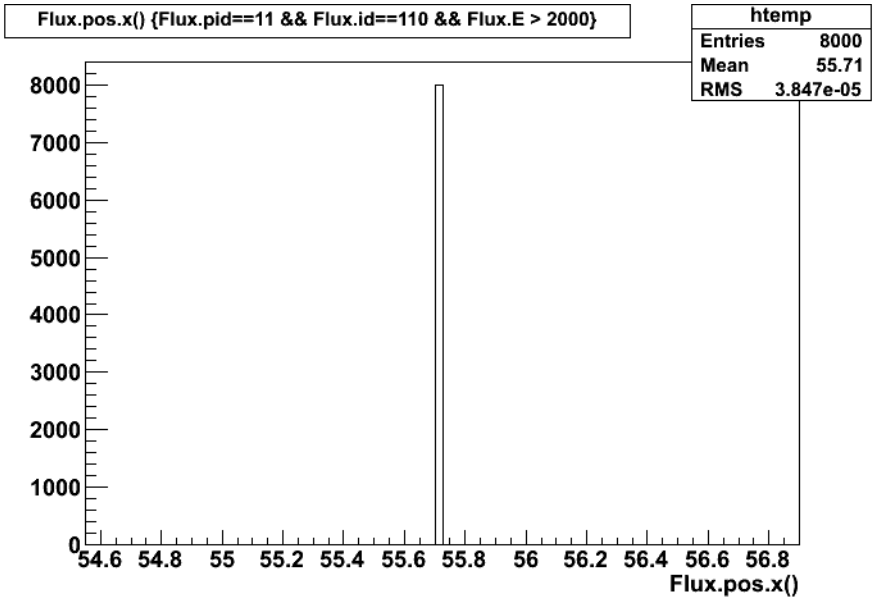
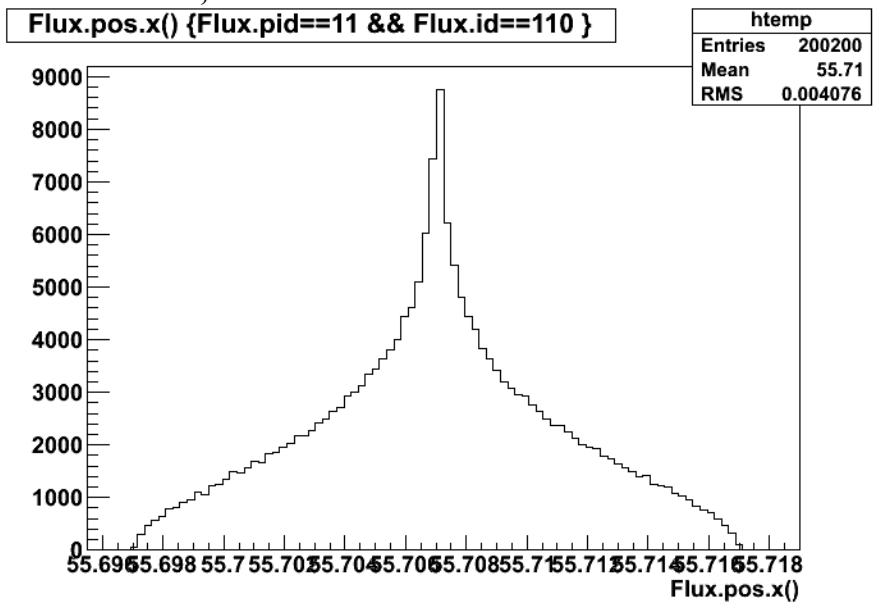


Position Plots, Electron Beam:



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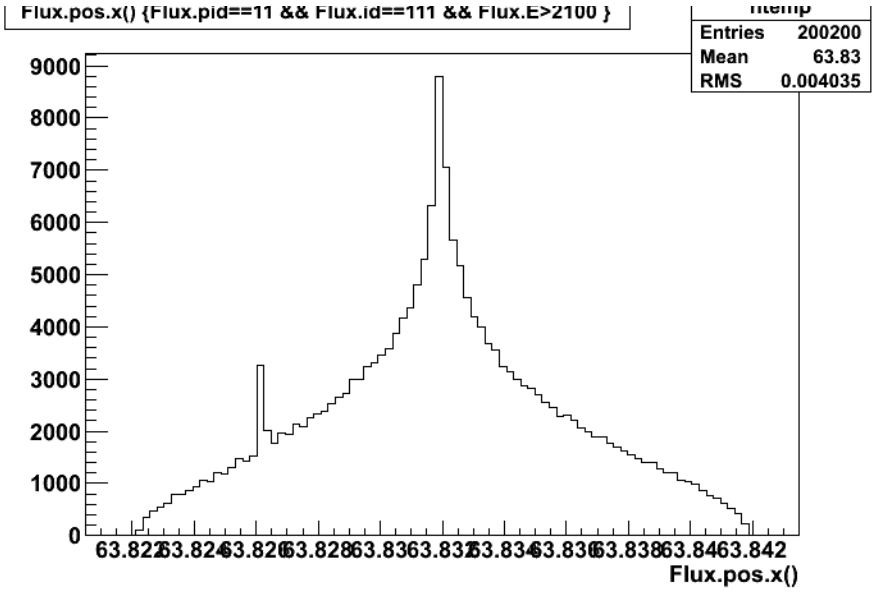

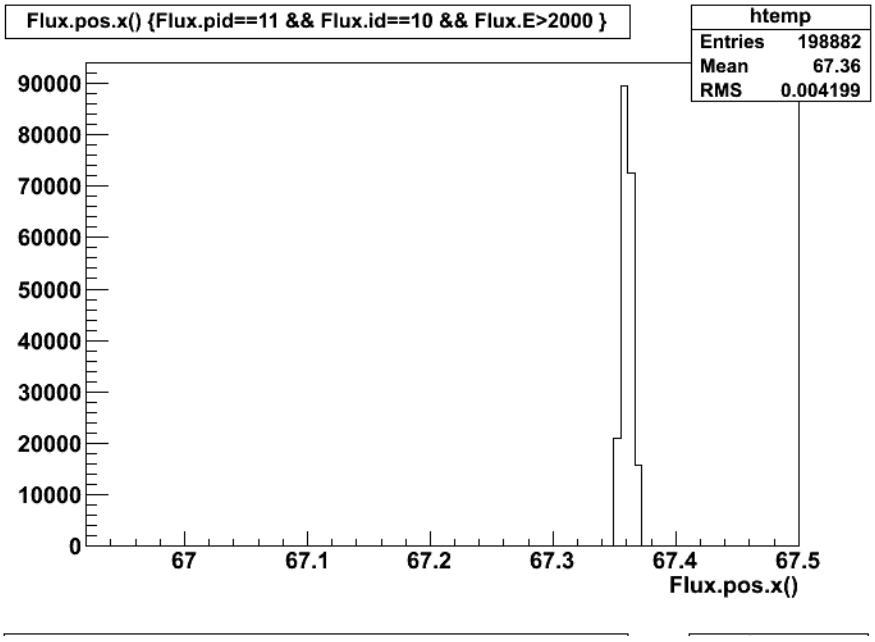

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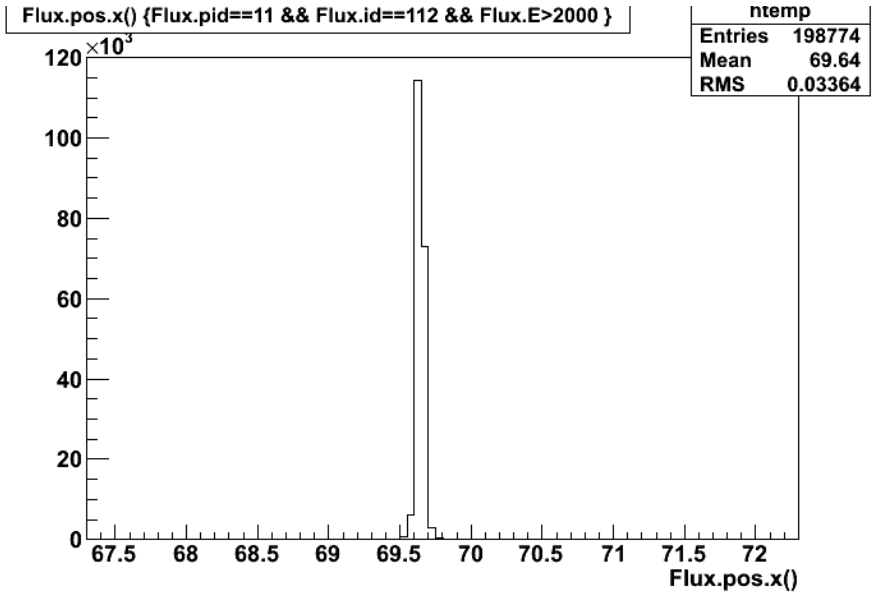

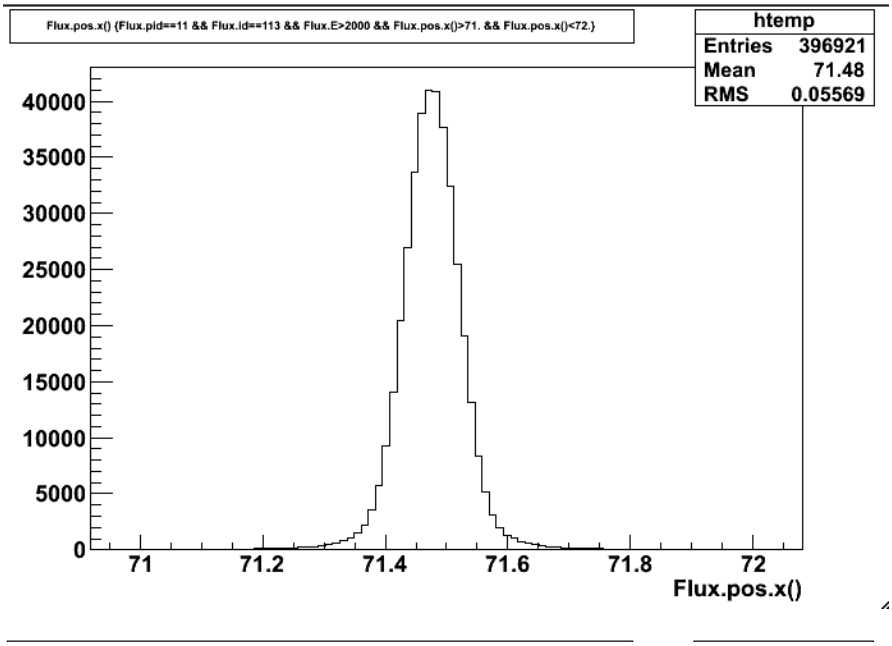

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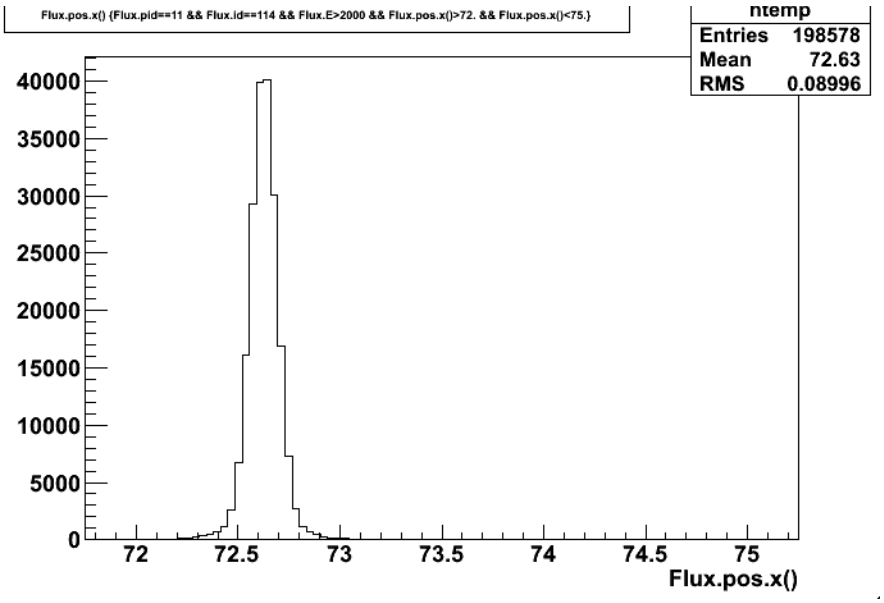

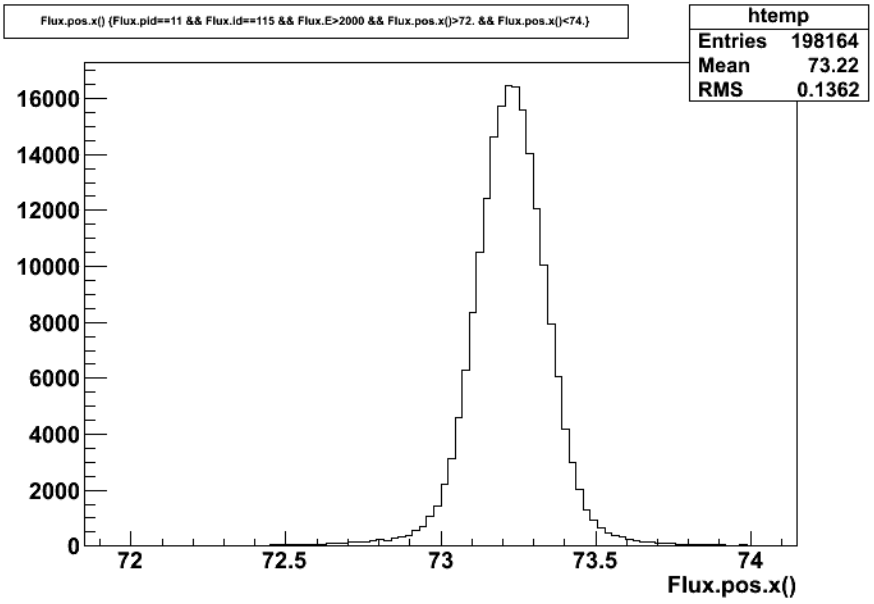

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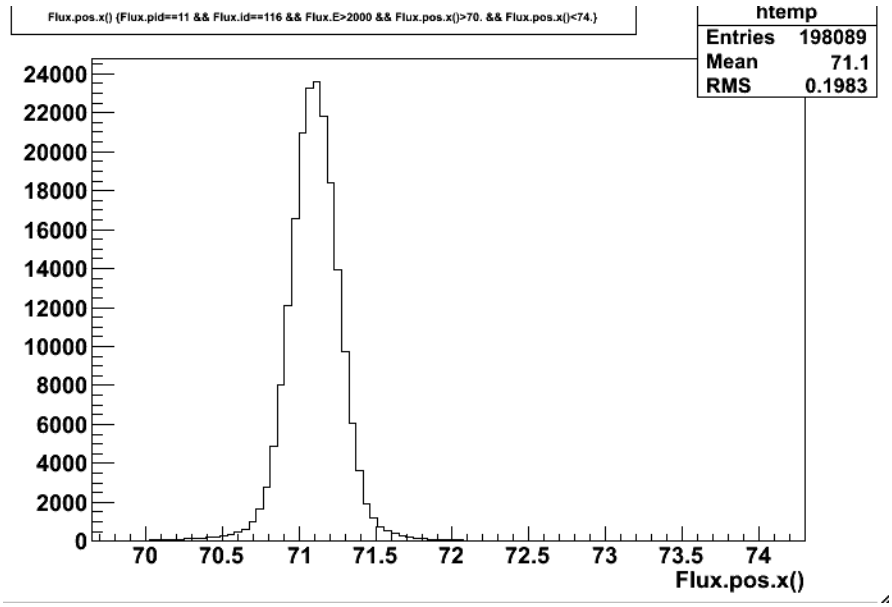

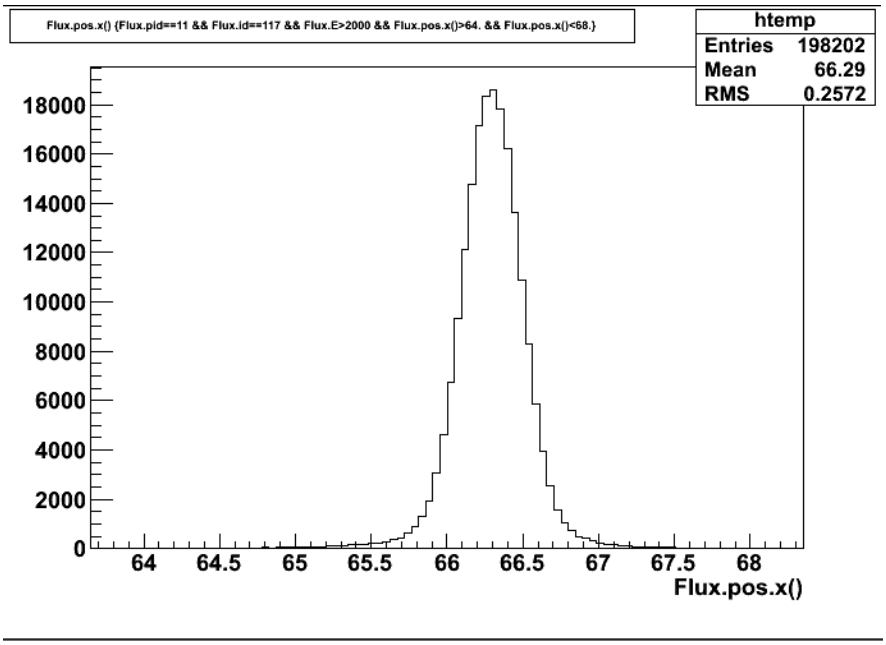

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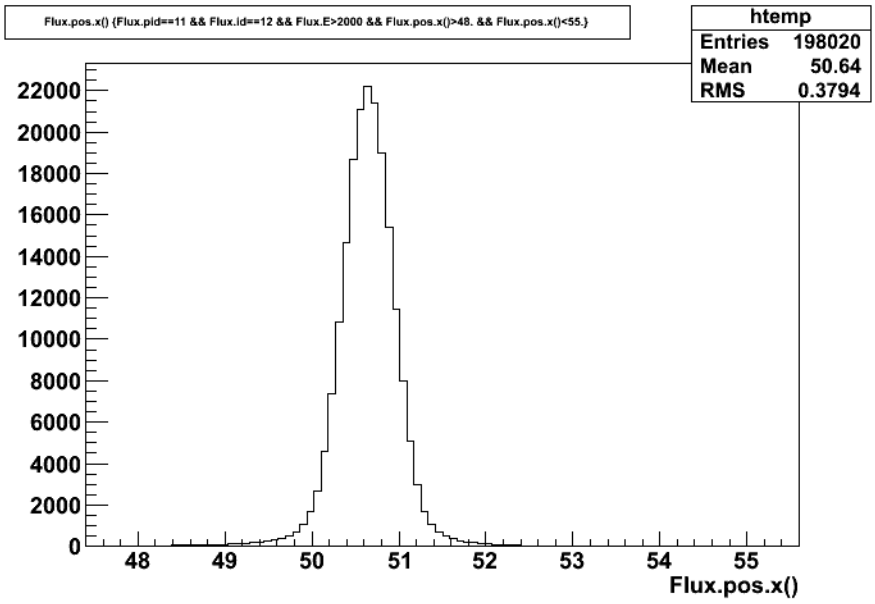

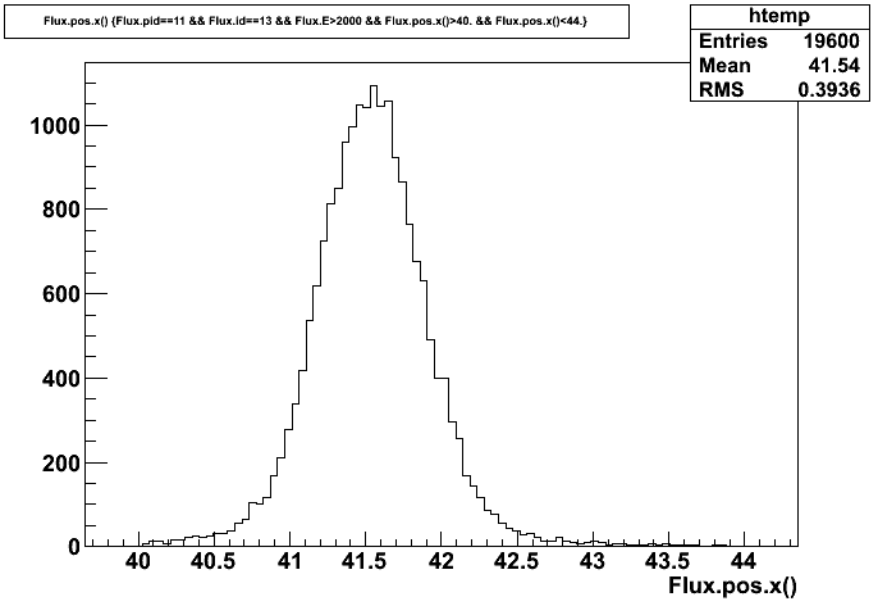

Position Plots Photon Beam

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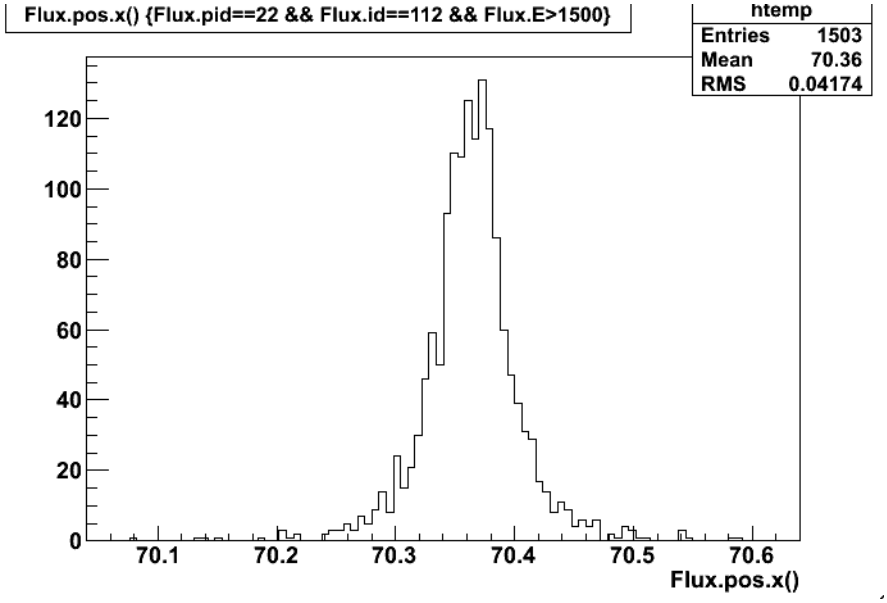

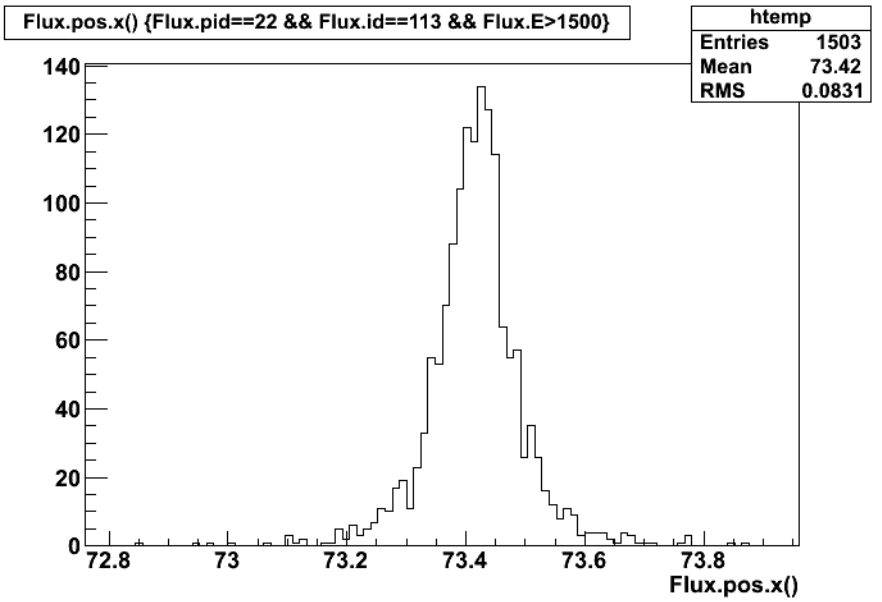

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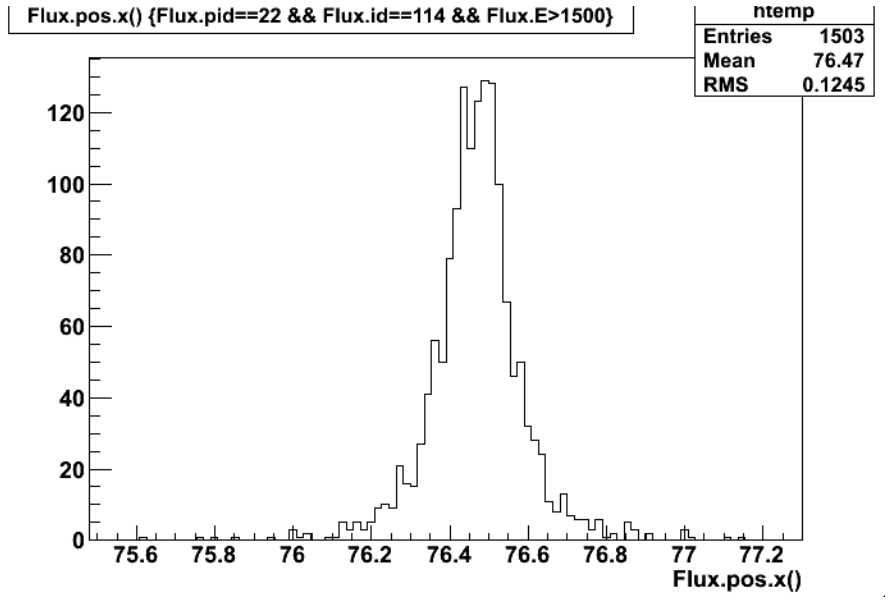

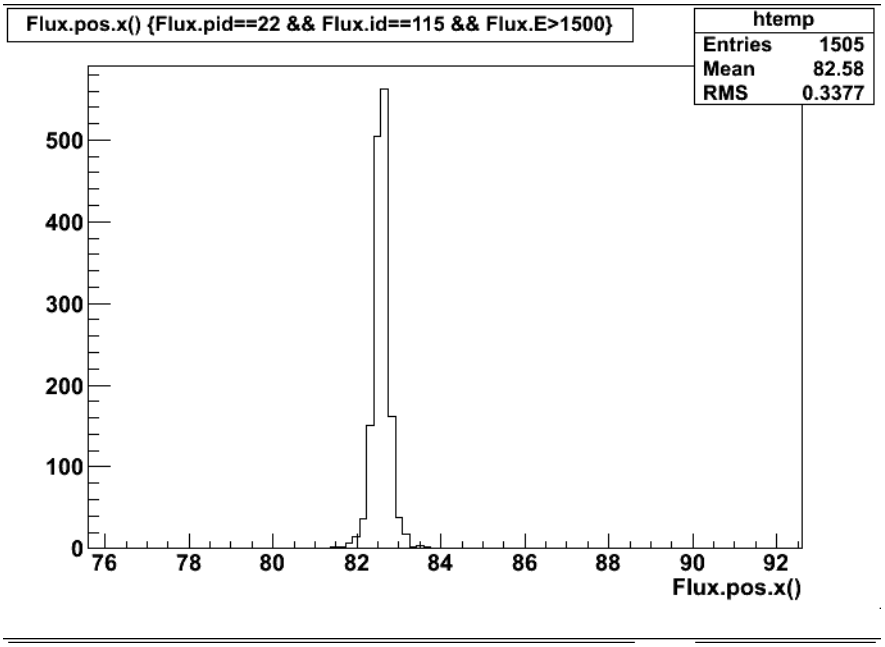

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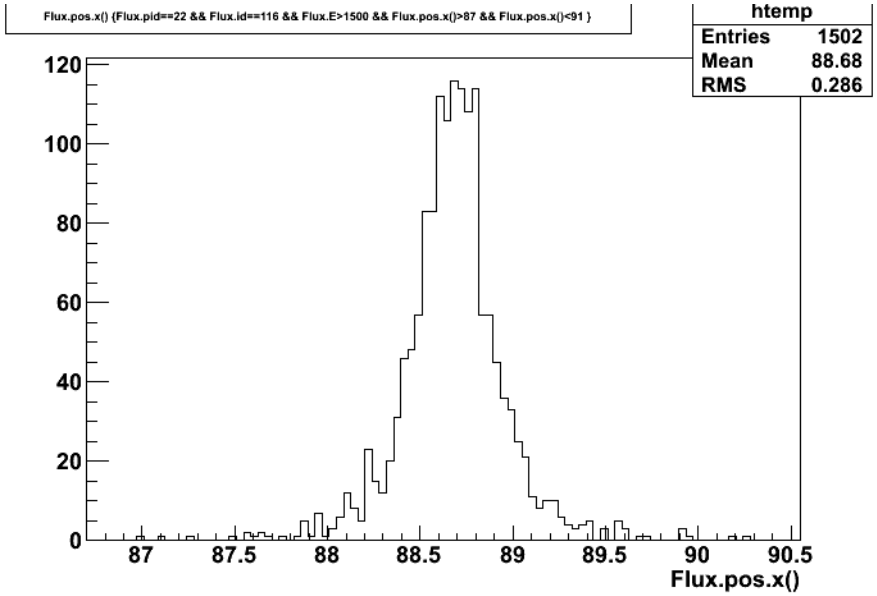

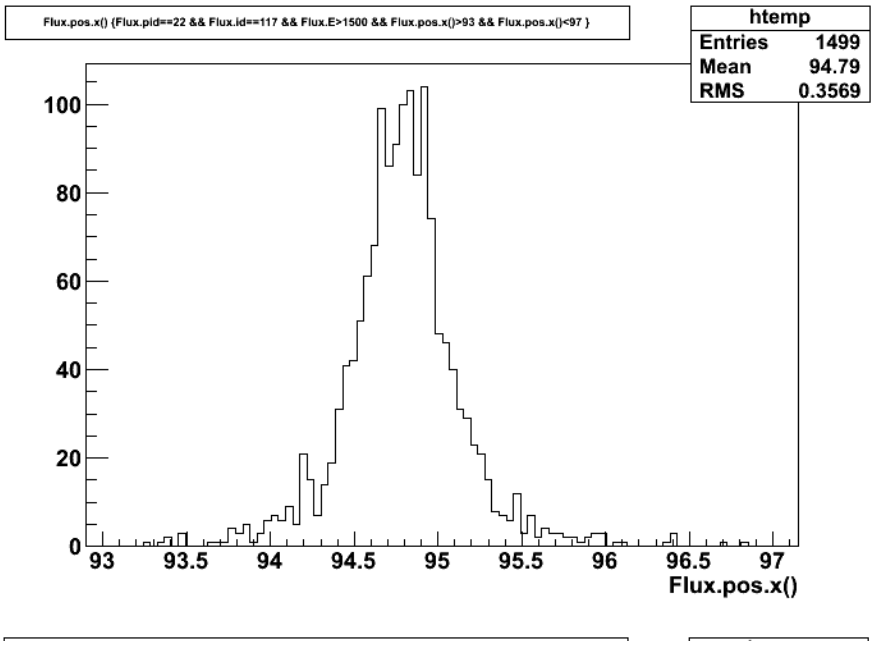

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