Status of HBD Monte Carlo simulation.

- Conversion probability in the HBD
- Average number of cherenkov photons as a function of ZED

Conversion probability studies -I

Several simulation projects to study conversions in the HBD have been carried out:

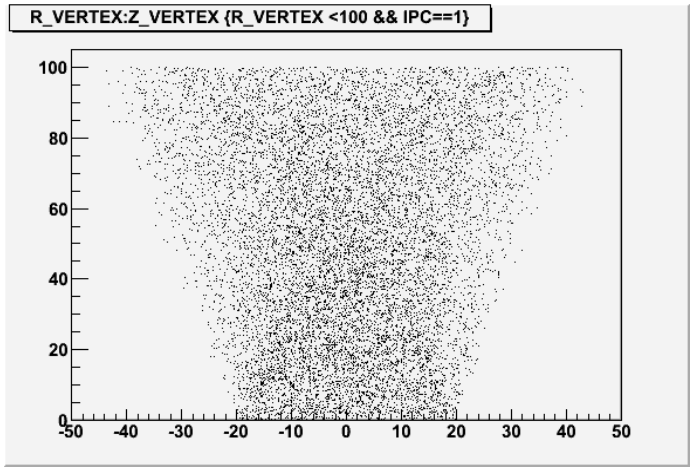
- (air) No beam pipe, no HBD
- (pipe) Beam pipe, no HBD
- (window) Beam pipe, HBD window
- (cf4) Beam pipe, HBD window, HBD CF4
- (panel) Beam pipe, HBD window, HBD CF4, HBD active panel
- (electronics) Beam pipe, HBD window, HBD CF4, HBD active panel, HBD electronics

In each case 5M of 1 GeV photons were generated in PHENIX acceptance in EXODUS and passed through PISA. All physical process, except pair production, are switched OFF.

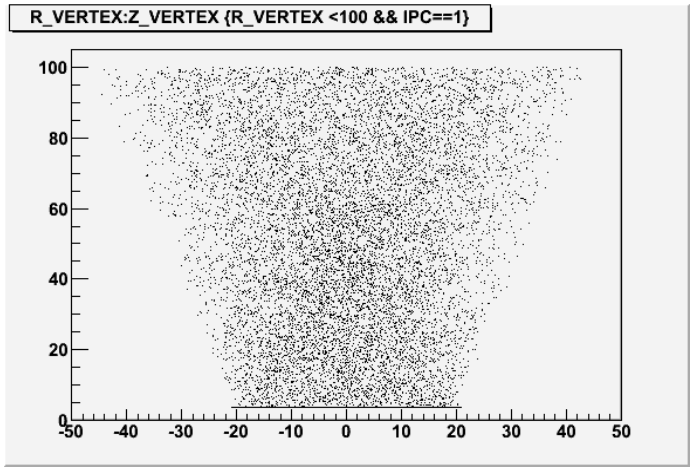
Count conversions with R_VERTEX<100 cm seen by PC1:

```
AncPad->Draw("R_VERTEX:Z_VERTEX","R_VERTEX <100 && IPC==1")
```

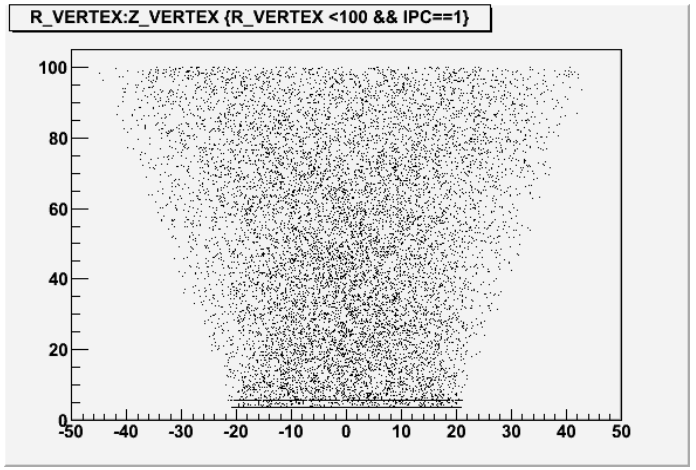
Conversion probability studies-II



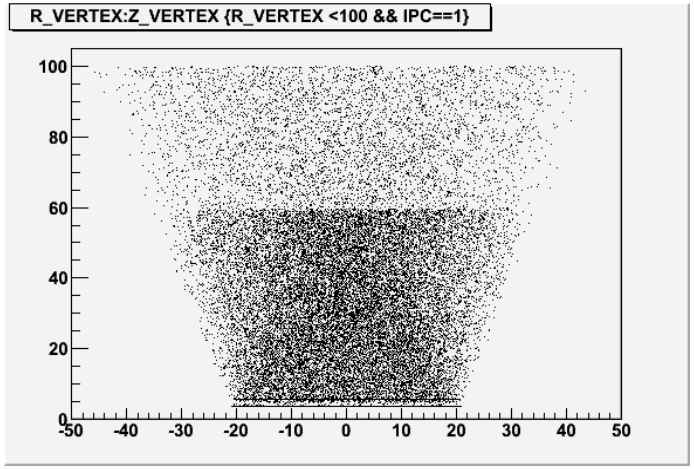
air



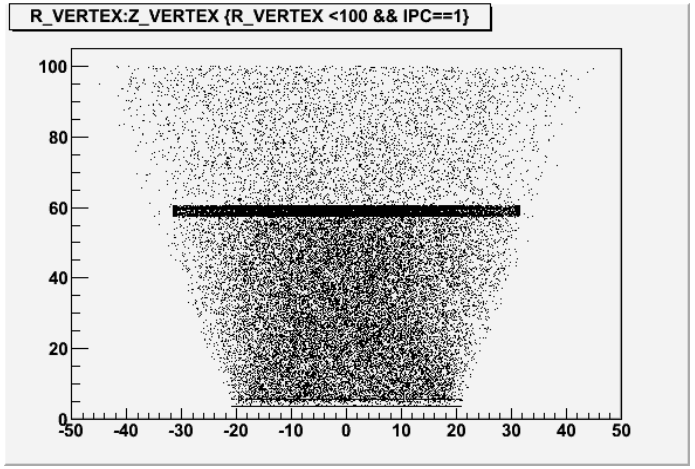
pipe



window



cf4



panel

Conversion probability studies -III

Number of e^+/e^-	Measured	Calculated
air:	23194	25568
air R>3.8 cm:	22309	
pipe:	42484-22309=20175	22033
window:	44232-42484=1748	3252
cf4:	76639-44232+22309=54716	46296
panel:	106368-76639=29729	28000
electronics:	106783-106368=415	155556

Good agreement for air and pipe, not so good for many HBD elements

Cherenkov radiation studies

Generate electrons:

Energy: 1 GeV,
Phi: 170° (close to the center of module #3)
Theta: 90° (perpendicular to beam pipe)
Zvertex: 0cm, 5cm, 10cm, 15cm, 20cm, 25cm

Look at number average number of cherenkov photons per event.

Vertex	Mean	RMS
0	2.5	2.2
5	6.0	2.5
10	5.8	2.6
15	5.8	2.4
20	6.0	2.6
25	5.9	2.5

There is no strange dependence of average number of cherenkov photons on Z as seen before, but average # of cherenkov photons has to be tuned

Need to check for other theta angles