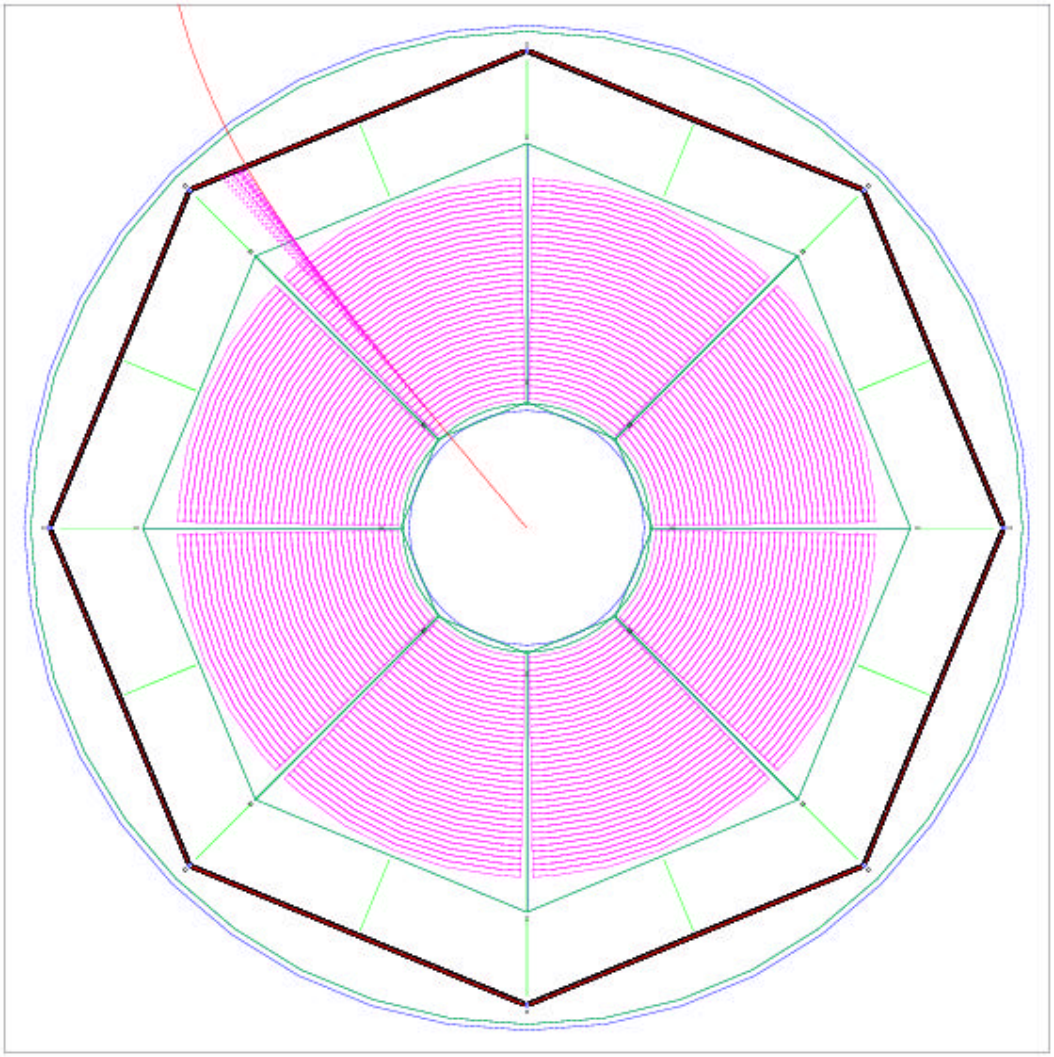
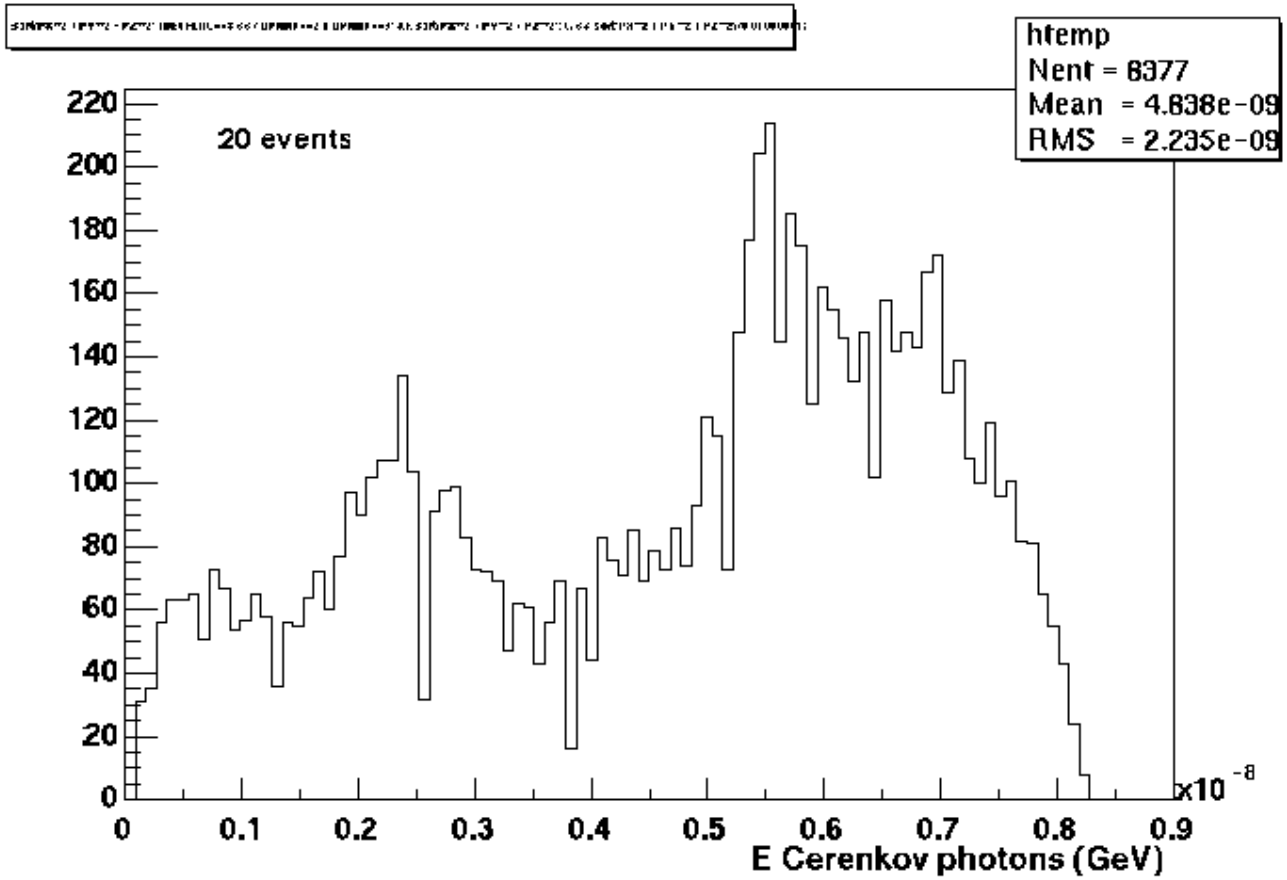
TPC/HBD Simulation Update

C. Aidala, PHENIX Core Week April 2002

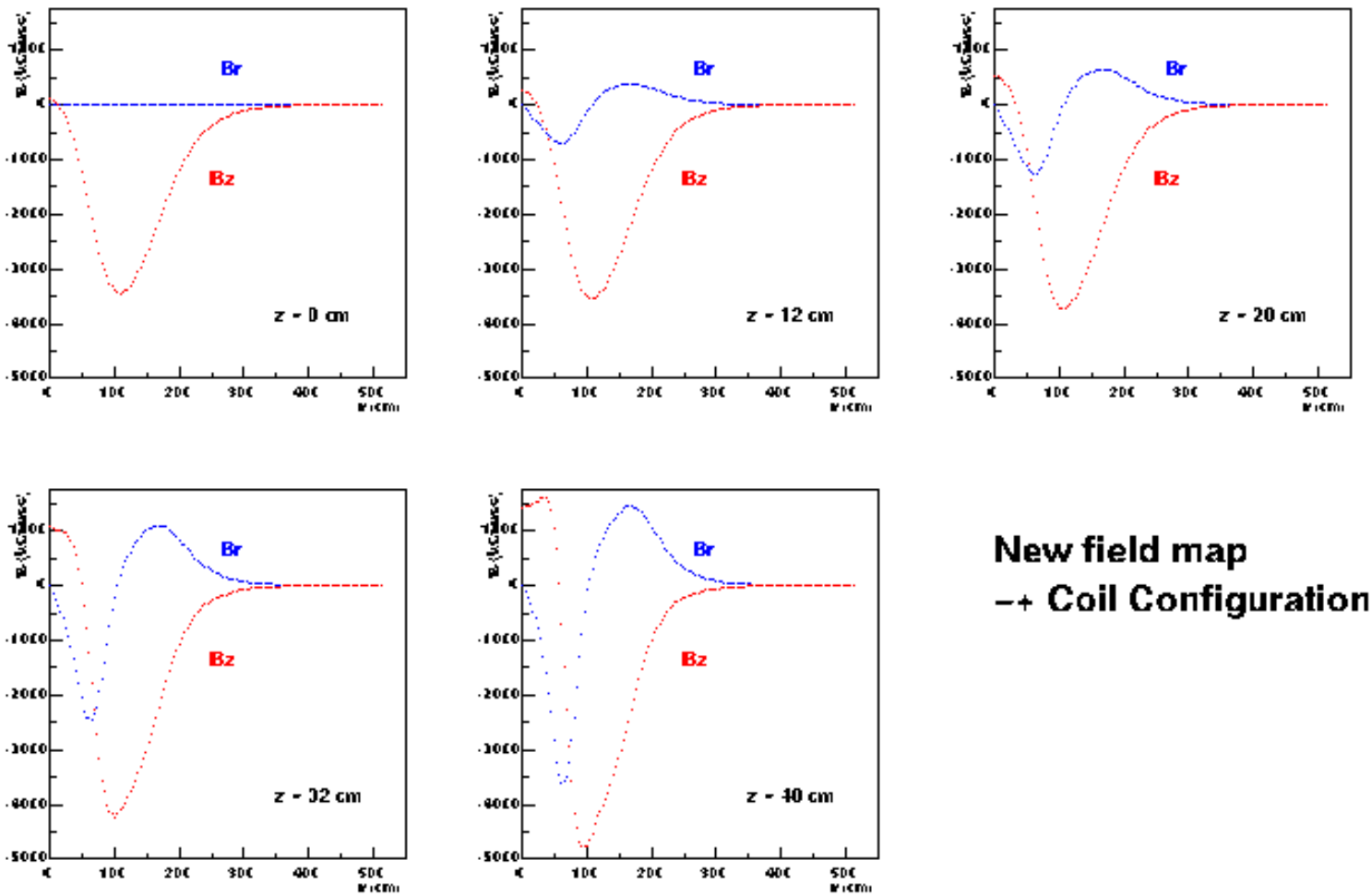
Now we've got Cerenkov radiation!



Energy spectrum of Cerenkov photons hitting the HBD: CH_4 radiator gas

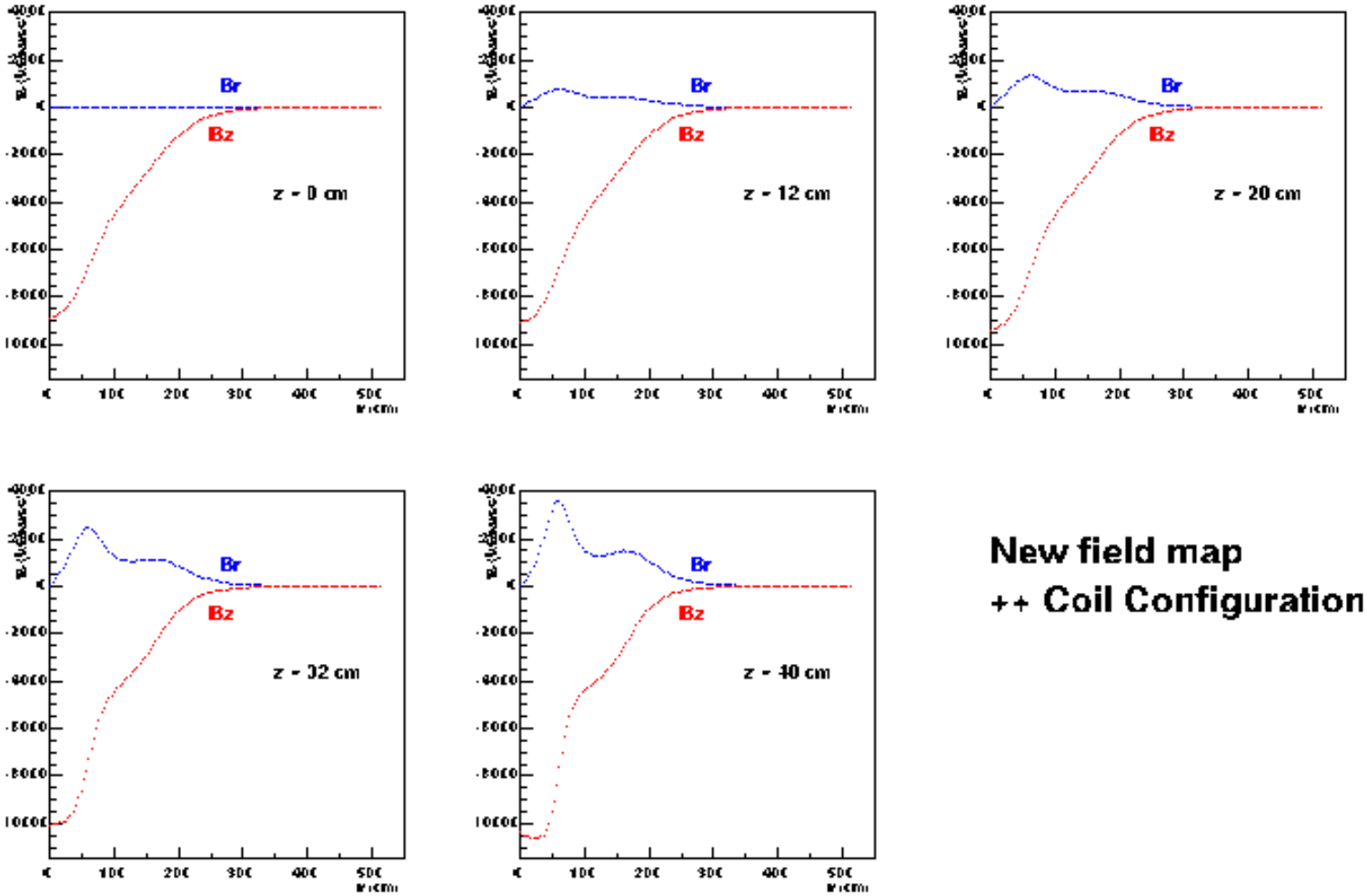


We've also got a new field map!



New field map
–+ Coil Configuration

++ Configuration field map



New field map
++ Coil Configuration

e+- Multiplicities/event in TPC

No min. hits/track required in TPC

Averaged over 200 events	No Si	Si
No field (Tracking down to 1 MeV)	24.4	80.2
No field (Tracking down to 10 MeV)	22.0	70.6
No field (Tracking down to 20 MeV)	20.4	66.2
Field (Tracking down to 1 MeV)	33.7	89.5
Field (Tracking down to 10 MeV)	30.5	81.4
Field (Tracking down to 20 MeV)	27.0	73.5

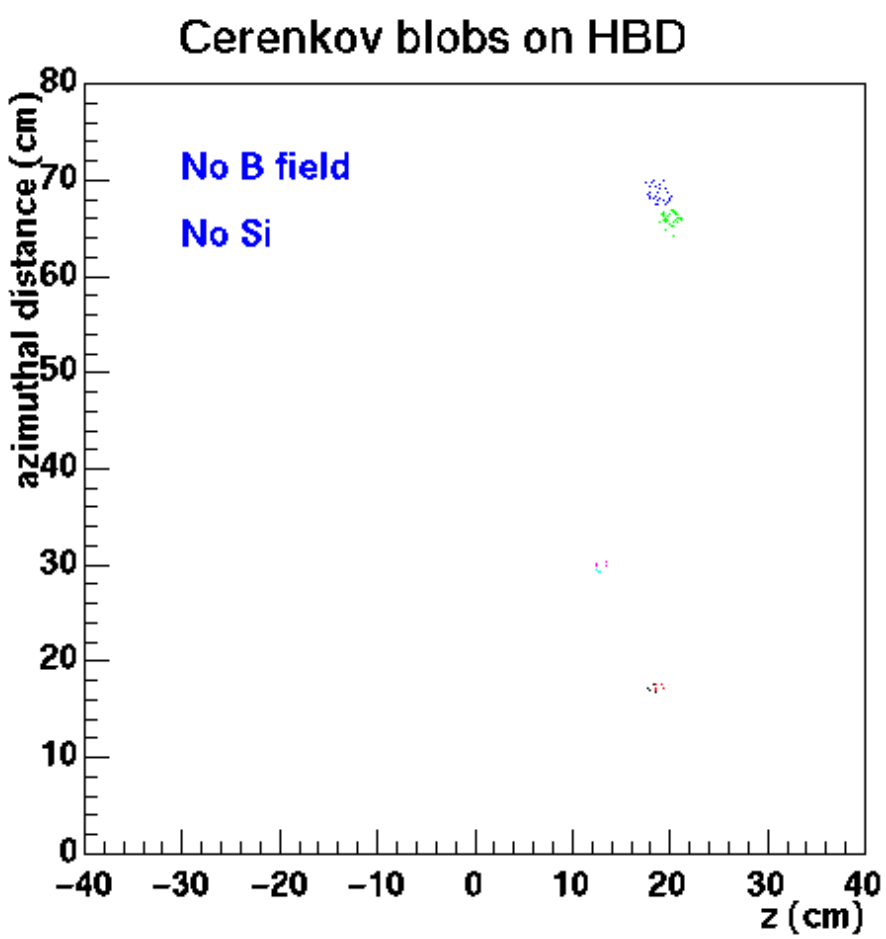
e+- Multiplicities/event hitting HBD

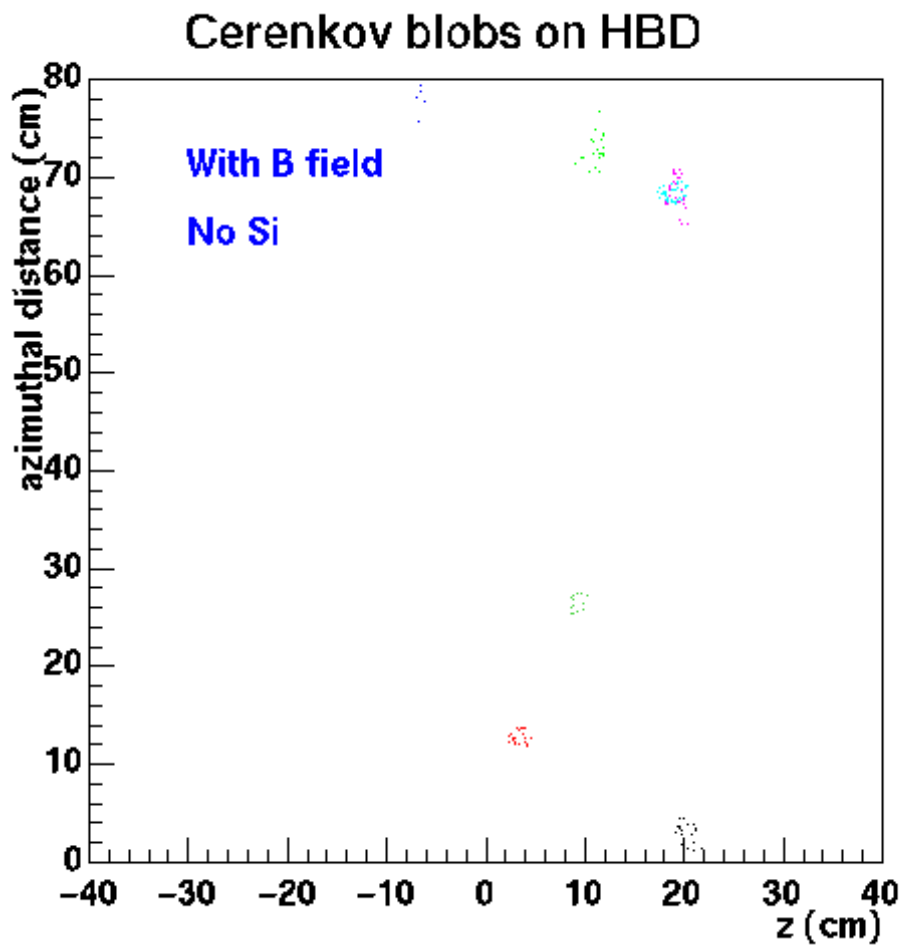
Averaged over 200 events	No Si	Si
No field (Tracking down to 1 MeV)	19.5	50.1
No field (Tracking down to 10 MeV)	17.5	43.9
No field (Tracking down to 20 MeV)	16.3	42.3
Field (Tracking down to 1 MeV)	28.4	59.8
Field (Tracking down to 10 MeV)	25.3	56.5
Field (Tracking down to 20 MeV)	22.6	51.6

What would the HBD see?

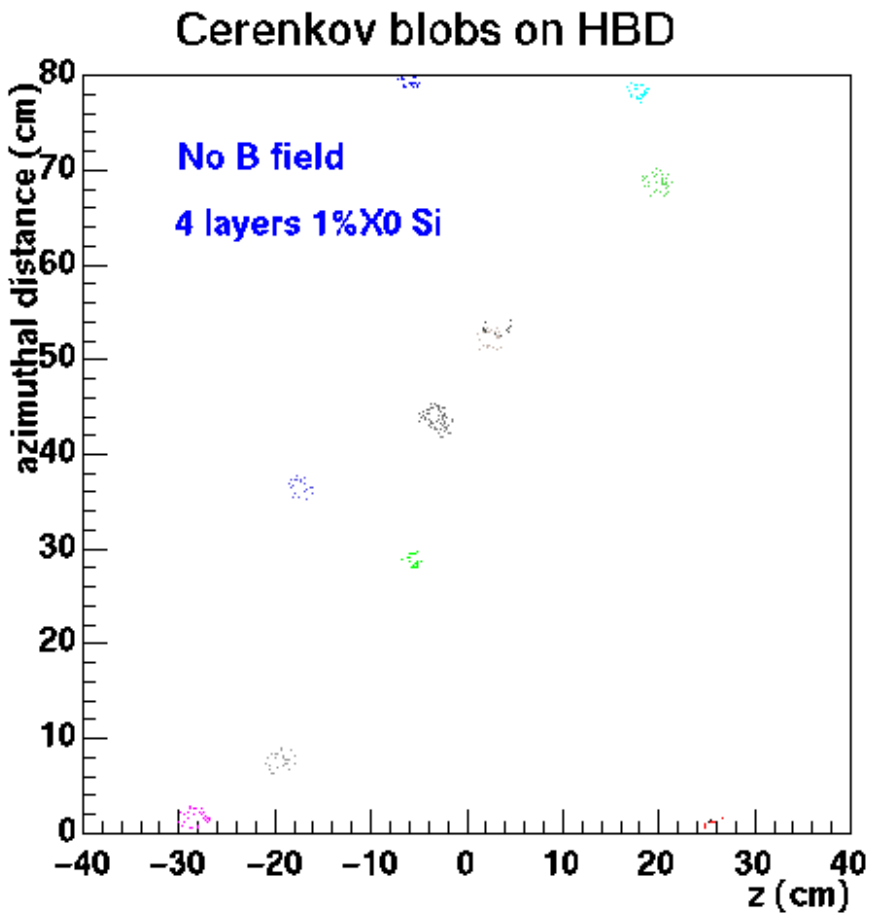
~20(?) photons/track hit the HBD--need to investigate further!

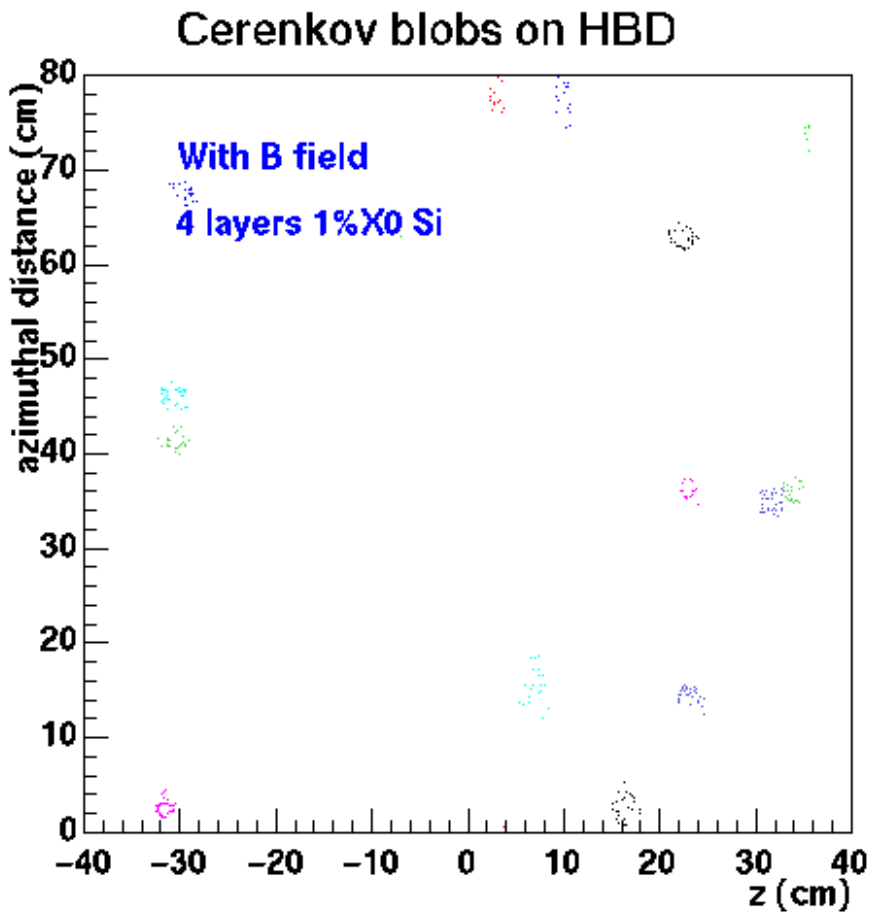
No Silicon



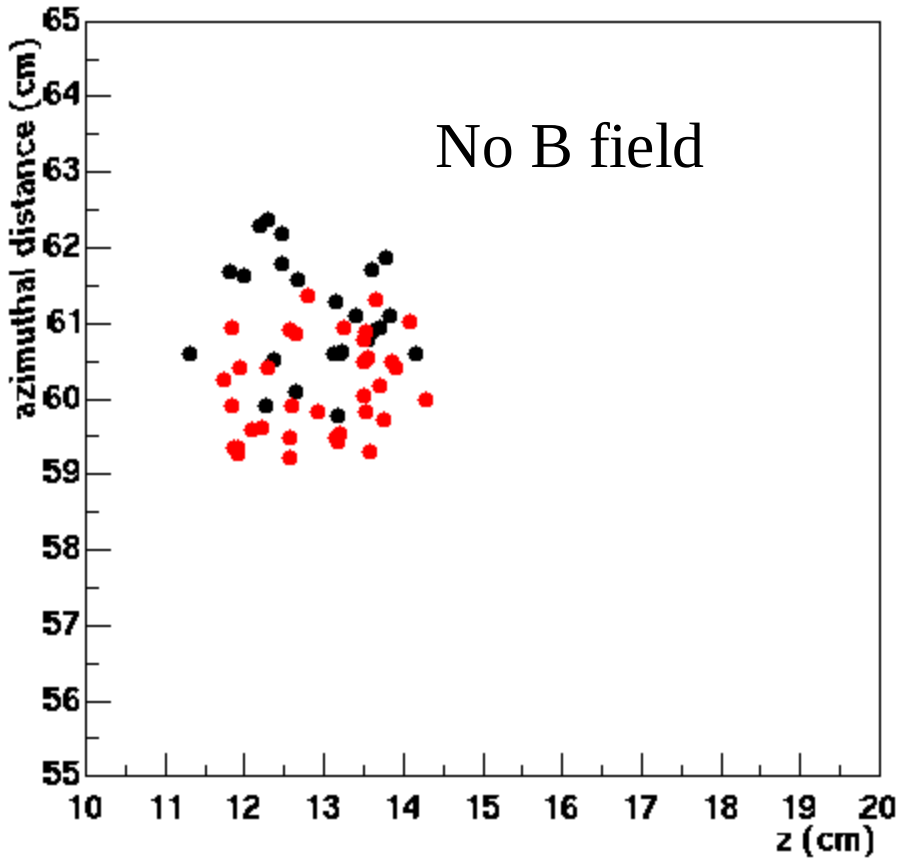


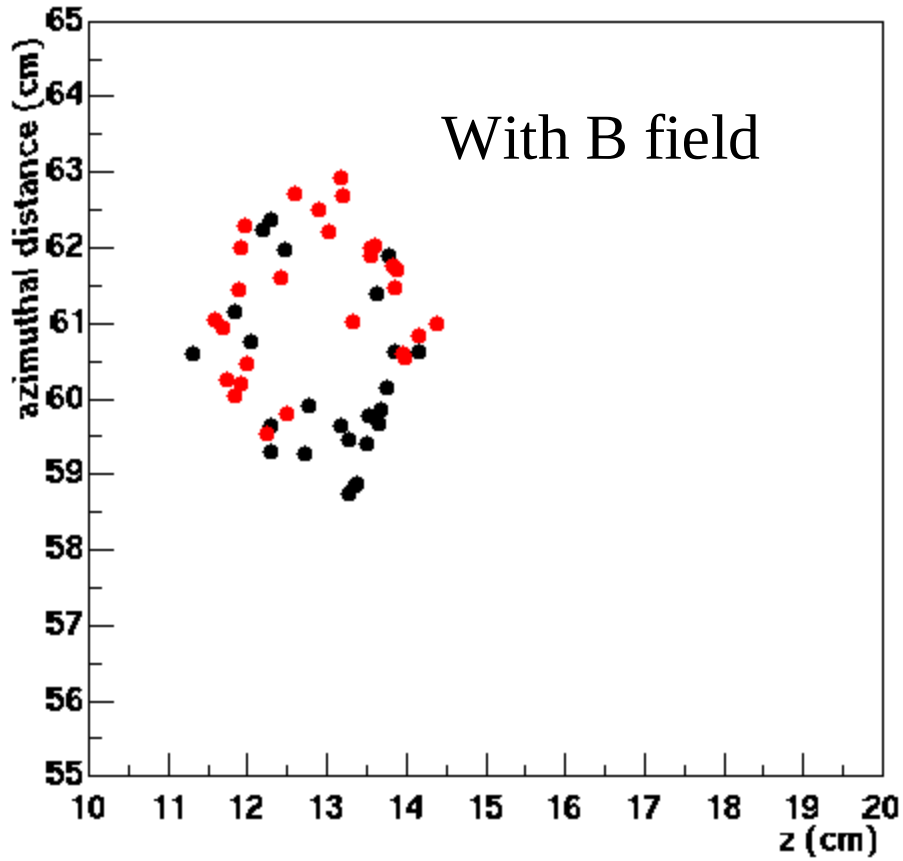
With Silicon



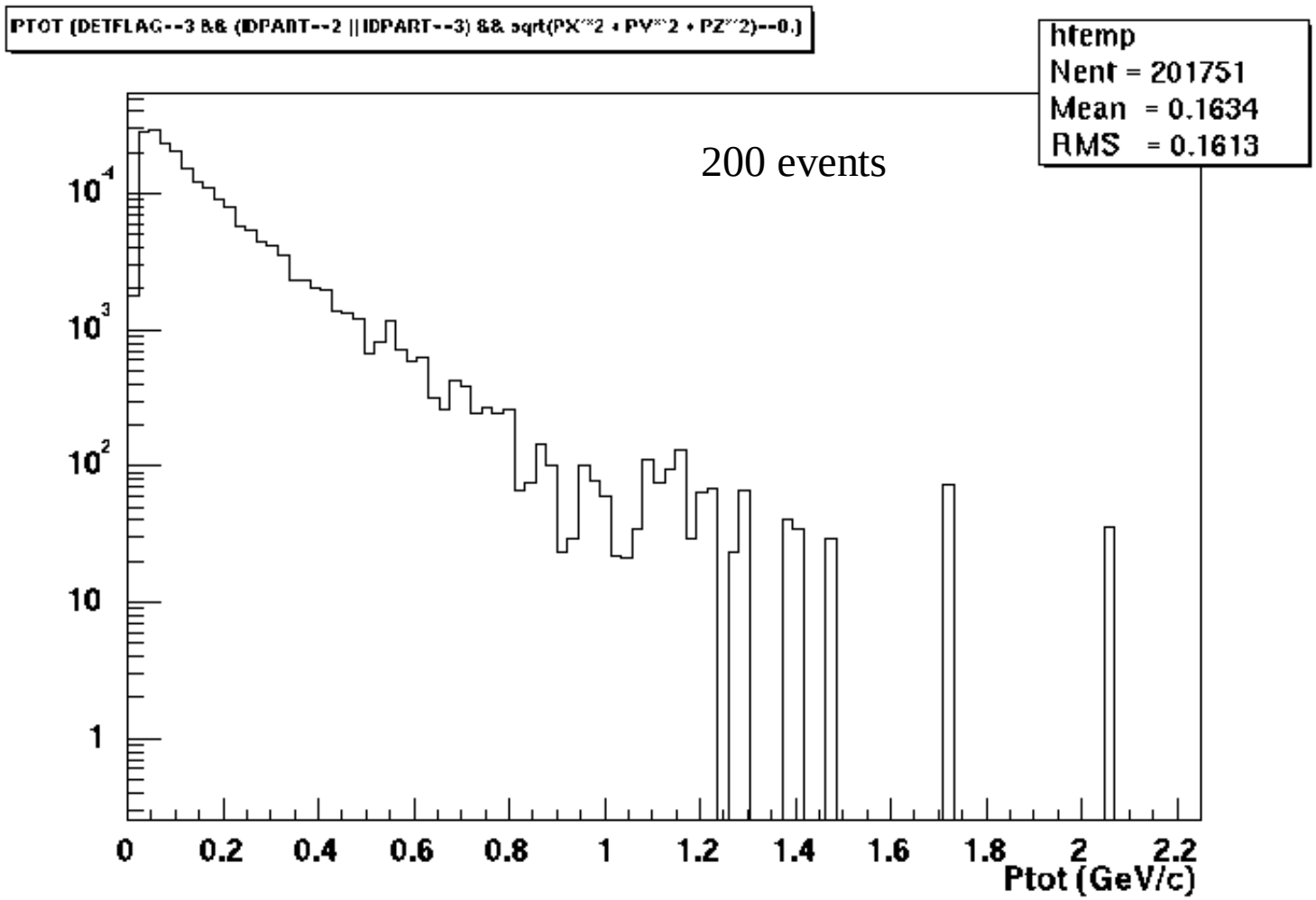


A closer look at a 100 MeV/c e^+ and e^-

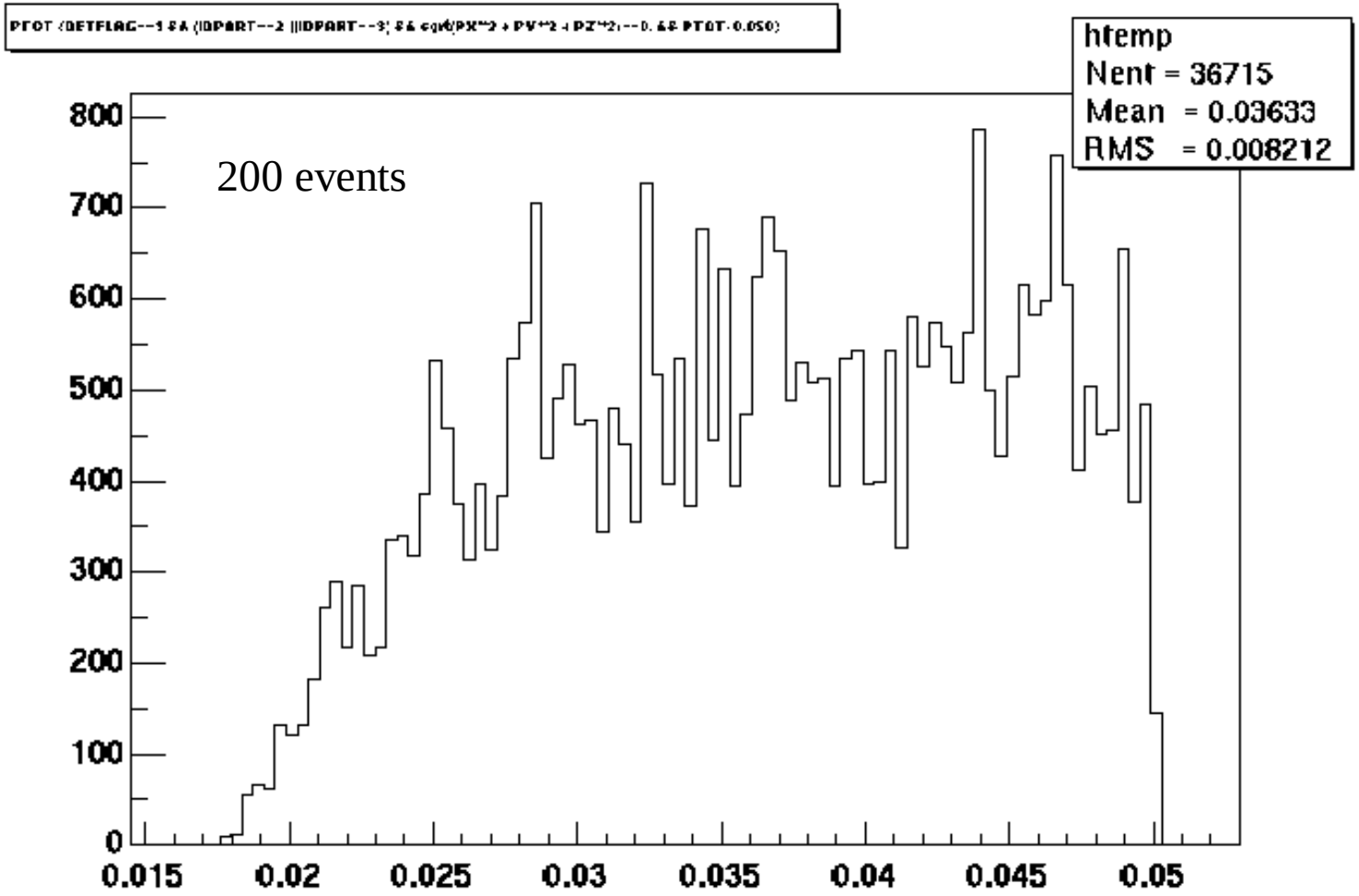




Ptot of e+- producing Cerenkov radiation



Ptot of e+- producing Cerenkov radiation -- up to 50 MeV



Multiplicities/event

Min. 5 hits/track required in TPC from PISA; no field

Particle species	EXODUS (averaged over 1000 evts)	+ beampipe and nosecones (1000 evts)	+ TPC/HBD (1000 evts)	TPC/HBD + 4 layers 1%X_0 Si (1000 evts)	TPC/HBD + 4 layers 2%X_0 Si (1000 evts)
All charged	1096.1	1107.3	1122.0	1161.7	1207.0
p/p-bar	57.6	58.6	60.4	63.4	65.3
K+-	92.7	92.1	92.3	90.5	89.2
pi+-	933.0	936.4	943.4	931.2	922.2
e+-	12.7 (9.1 Dalitz)	18.6	25.8	76.6	130.3