PVDIS
baffle,trigger and rate

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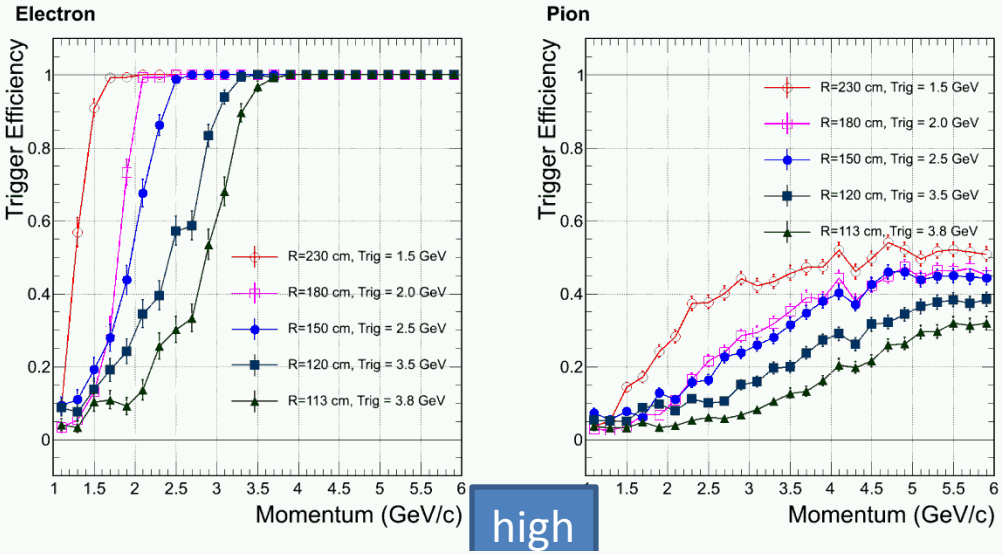
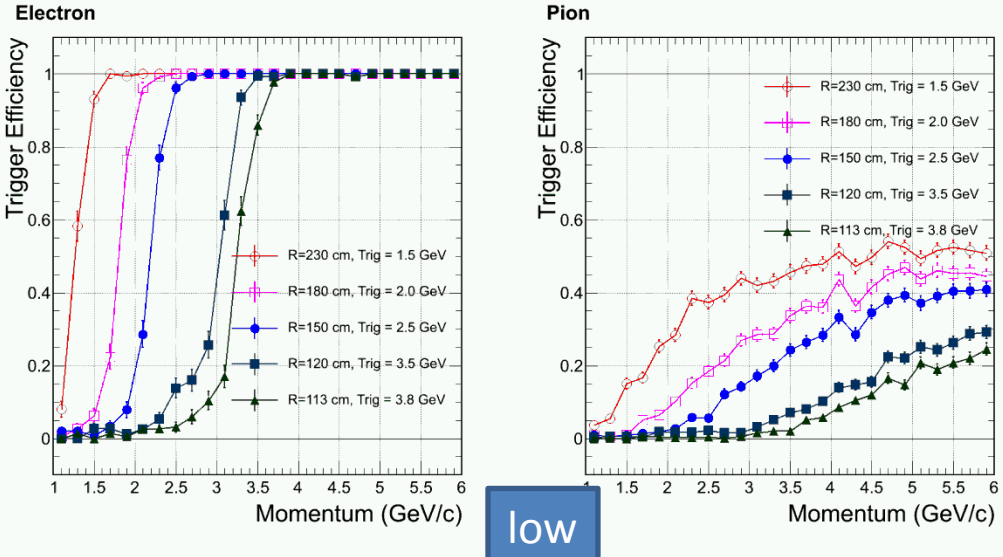
More1 trig

- trig_eff(P<0.5GeV) = 0
- trig_eff(0.5<P<1GeV) = 0.5*trig_eff(P=1GeV)
- trig_eff 9(Proton) = 0.5*trig_eff(pion)

Assumption



high



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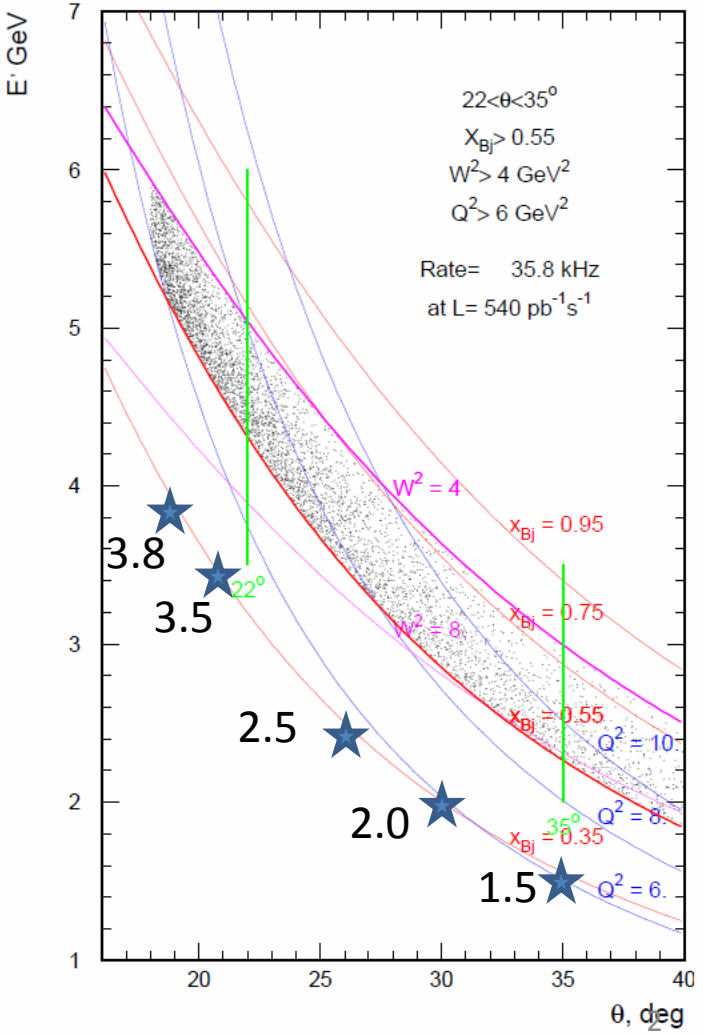


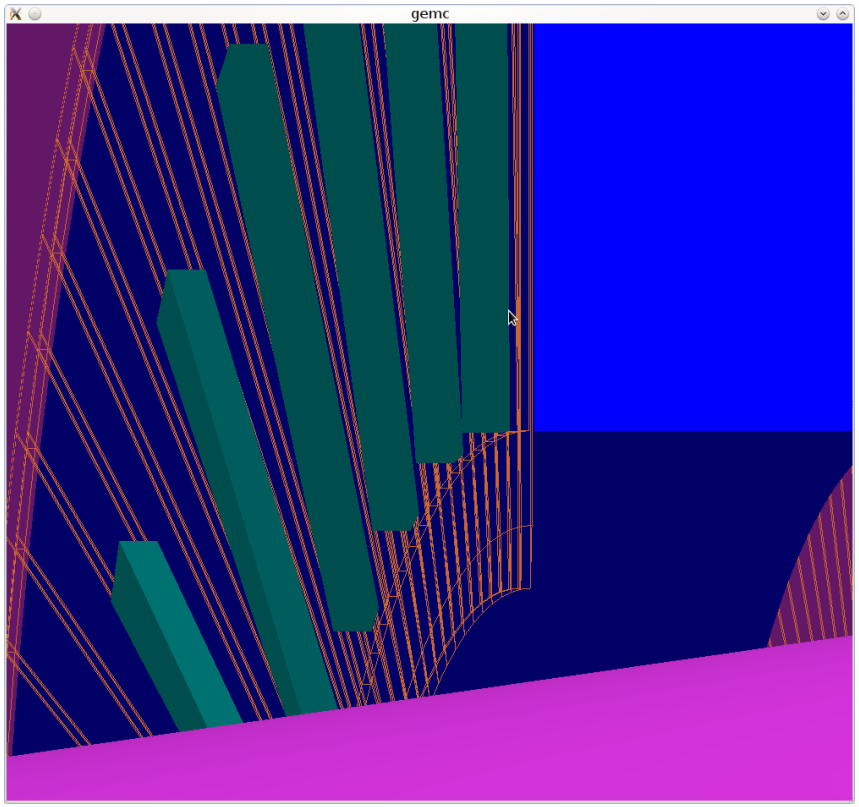
How to read the rate table on next slide

- All rate are in kHz
- All rate on whole EC plane, divide by 30 to get sector rate
- Top section is without trig cut, bottom section is with trig cut
- Rate has distribution over phi angle every 12 degree, we take 0-6 degree as high rate area and 6-12 degree as low rate area. The full rate area includes both

Rate (kHz)		More1 block(more1 trig)			More1 (CLEO trig)			More1 (more1 trig)		
		full	High	Low	full	High	Low	full	High	Low
e DIS	kry	413	148	265	469	205	264	same	same	same
π-	Kry				5.29e4	4.11e4	1.18e4	same	same	same
	lead	5.08e5	2.72e5	2.36e5	5.45e5	3.15e5	2.30e5	same	same	same
π^+	Kry				2.27e4	1.00e4	1.27e4	same	same	same
	lead	2.13e5	0.98e5	1.15e5	2.13e5	1.04e5	1.08e5	same	same	same
$\gamma(\pi^0)$	kry	0.50e4	0.50e4	0	1.20e6	1.20e6	0	same	same	same
	lead	8.44e7	4.16e7	4.28e7	7.51e7	3.37e7	4.14e7	same	same	same
p	Kry				3.65e3	1.80e3	1.85e3	same	same	same
	lead	5.50e4	2.38e4	3.12e4	5.49e4	2.65e4	2.84e3	same	same	same
Total (lead)					2.01e6	1.64e6	0.36e6	same	same	same
e DIS	kry	335	104	231	403	145	258	358	128	230
π-	Kry				5.22e3	4.00e3	1.22e3			
	lead	1.22e4	1.01e4	0.21e4	1.87e4	1.26e4	0.60e4	1.69e4	1.44e4	2.53e3
π^+	Kry				0	0	0			
	lead	1.35e3	970	381	2.48e3	1.09e3	1.43e3	3.82e3	3.07e3	0.75e3
$\gamma(\pi^0)$	kry	4.6	4.6		3.22e4	3.22e4	0			
	lead	230	230	0				1.31e4	1.31e4	0
p	Kry				0	0	0			
	lead	927	807	120	957	475	481	1.5e3	1.10e3	0.4e3
Total (lead)		1.53e4	1.25e4	0.28e4	5.34e4	4.59e4	0.75e4	3.53e4	3.17e4	0.36e4

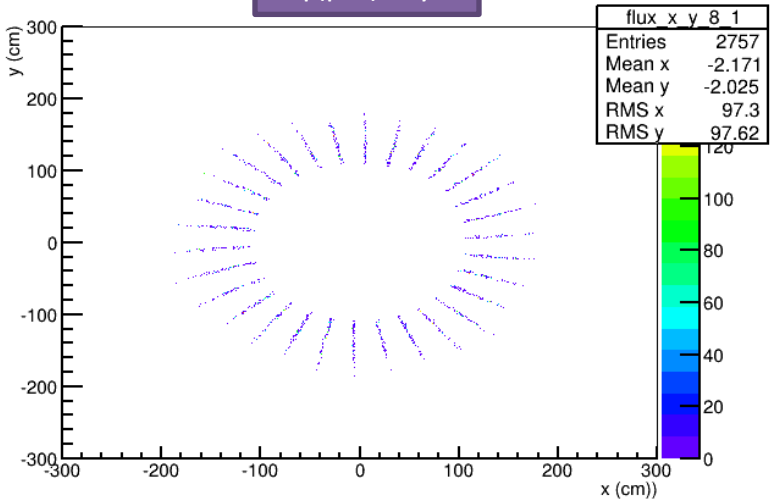
EC photon block

- EC module R(110,265)cm
- EC photon block (“more1 block”)
  - 30 of them
  - R(110-200)cm
  - Start from 2.2 degree and width 2.5 degree. (They can be further optimized)
  - 5cm(8*X_0) thick lead, hope to reduce photon energy by 1 order
- EC module reduction about 180, 10% of total

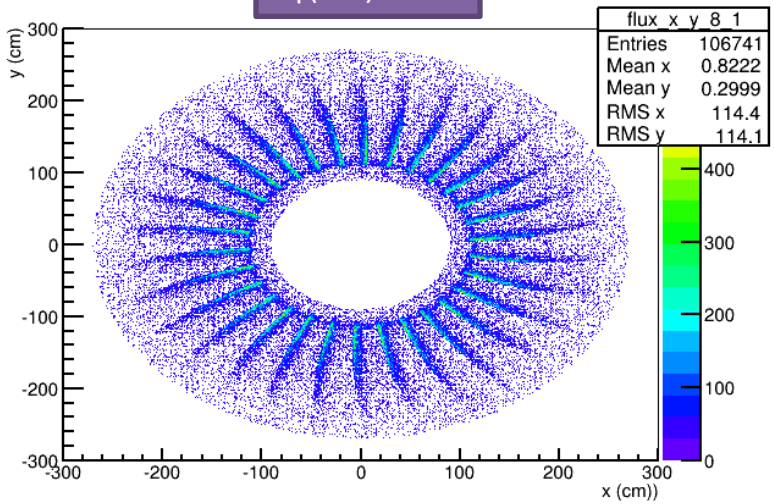


Rate of More1

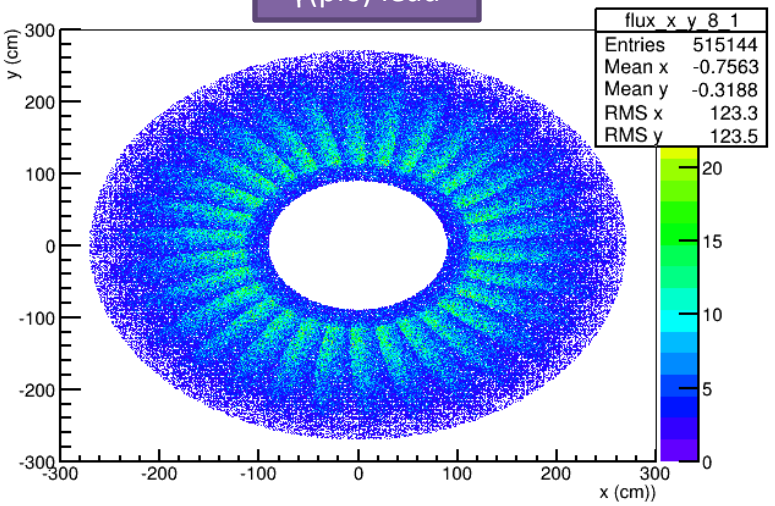
γ(pi0) Kry



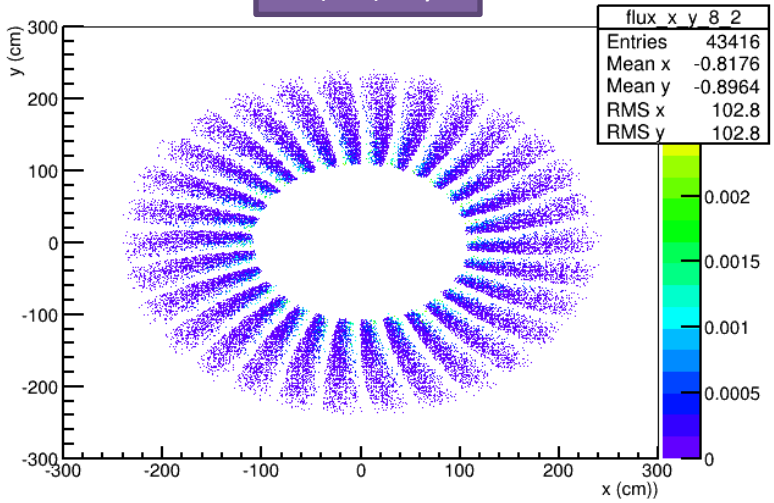
γ(EM) lead



γ(pi0) lead

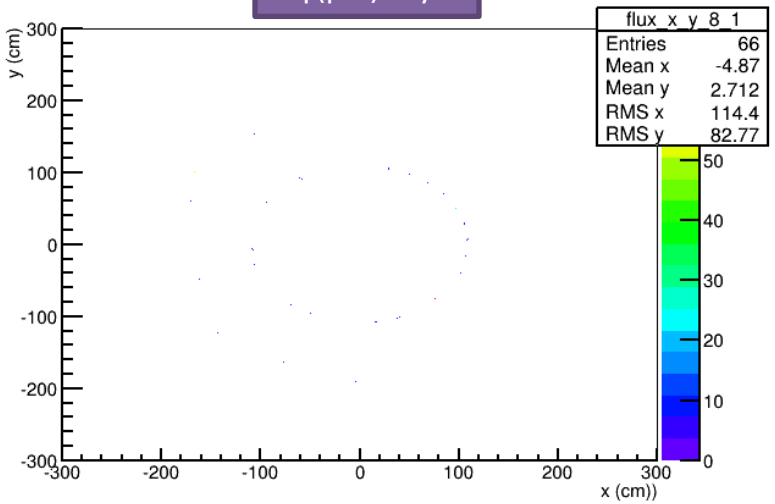


e(DIS) Kry

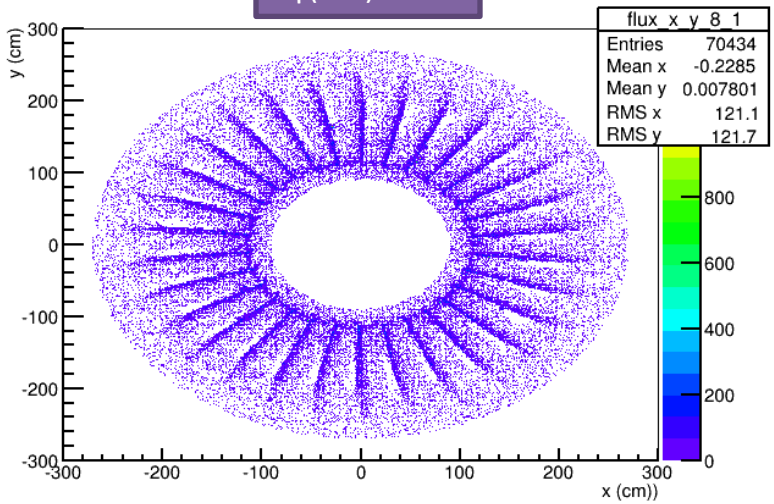


Rate of More1 block

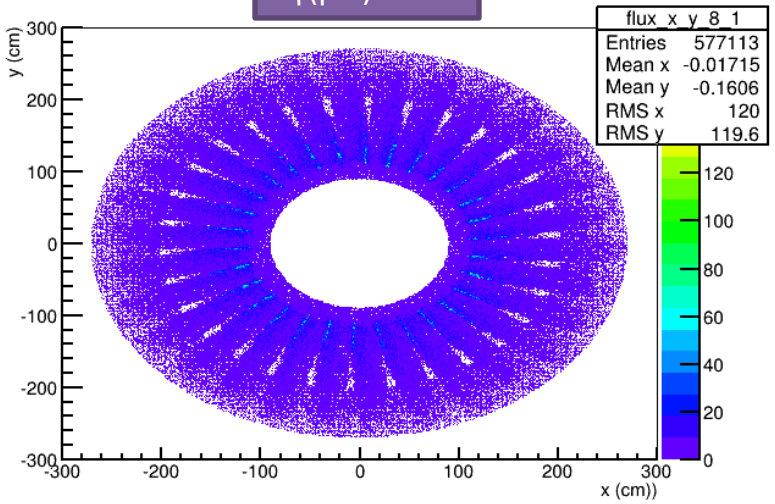
γ(pi0) Kry



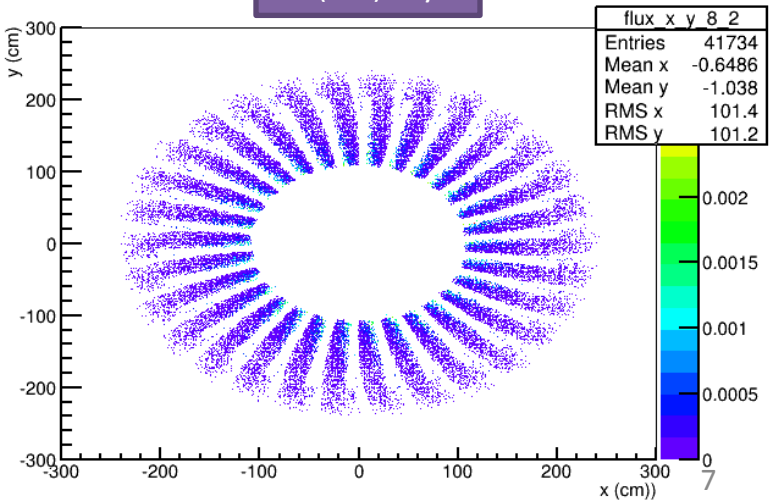
γ(EM) lead



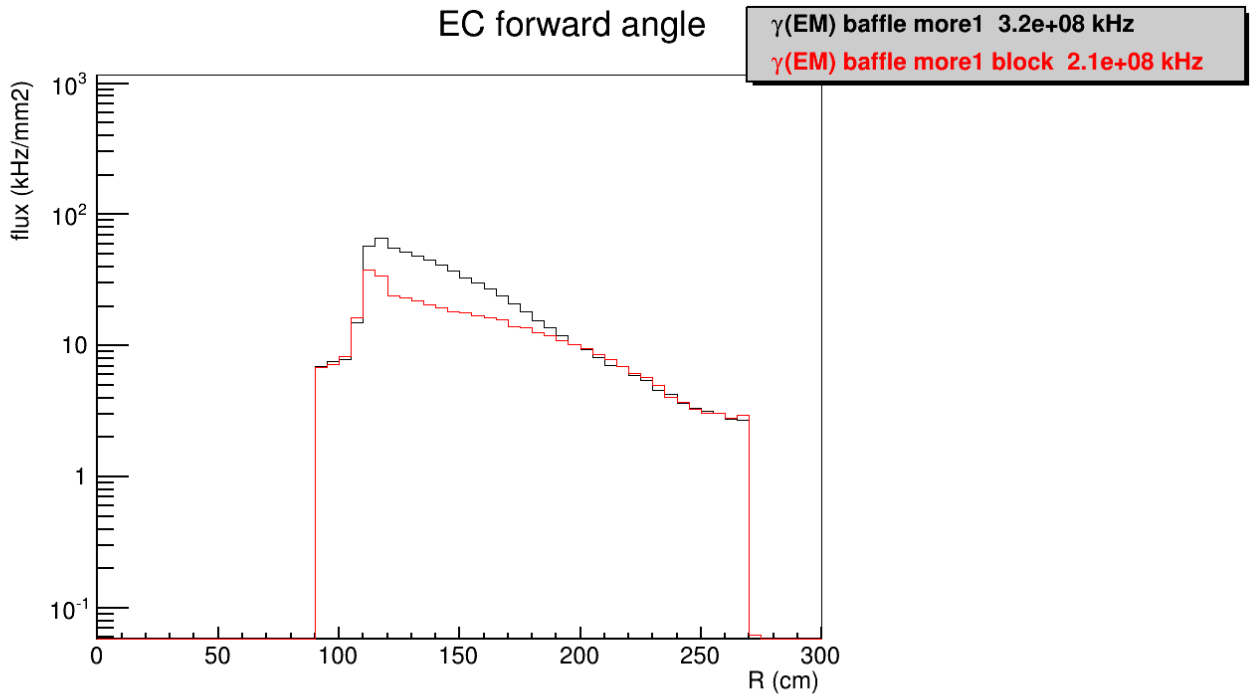
γ(pi0) lead



e(DIS) Kry



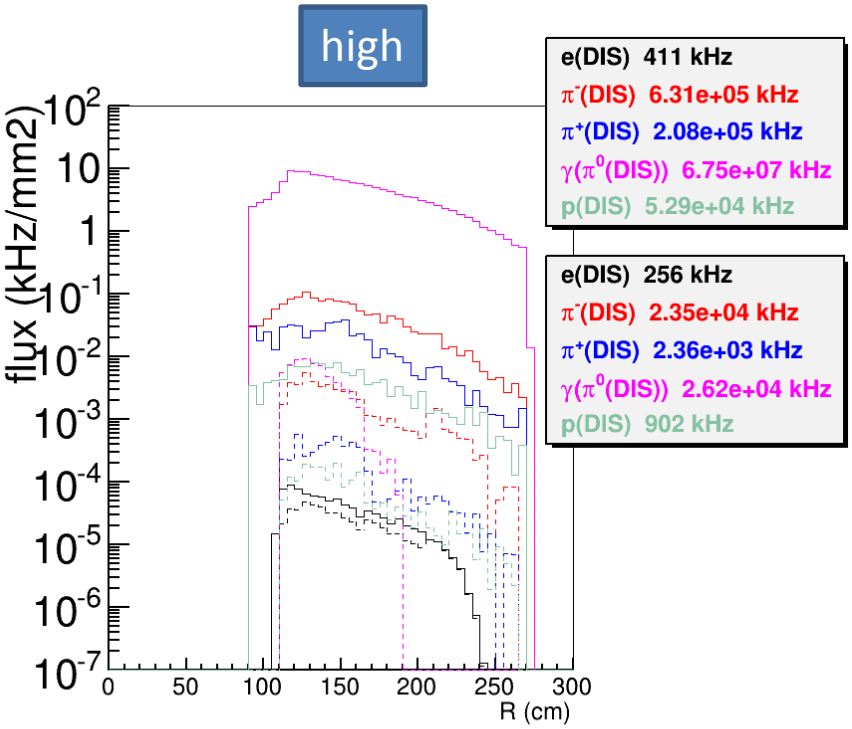
γ(EM) lead
rate of more1 and more1 block

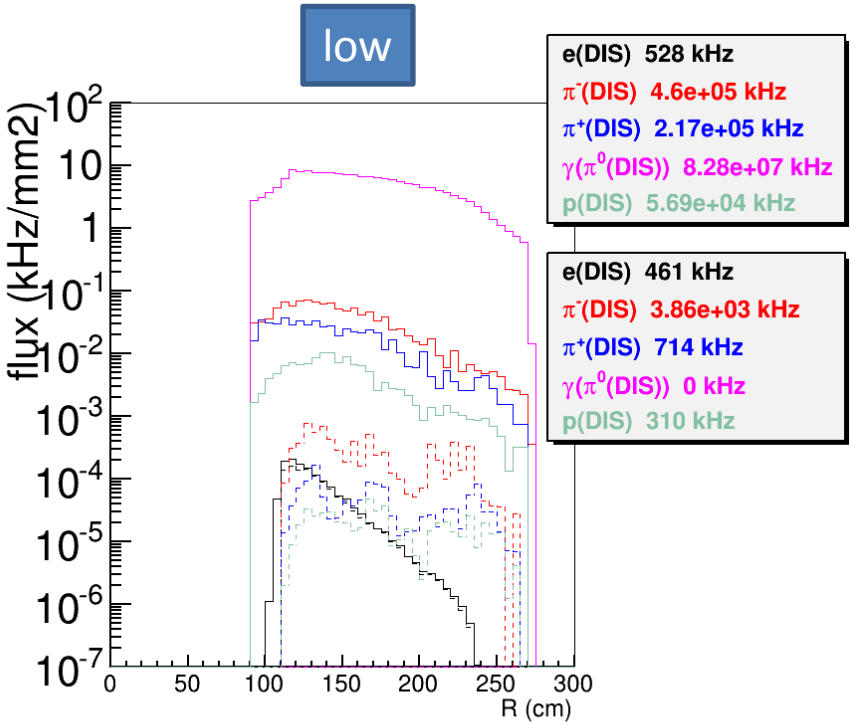


Trigger Rate Summary

- Max DAQ rate 65kHz per sector
- We need at most 31MHz total EC trigger rate with assumption Cherenkov 2MHz and 30ns window, as (31e6/30)*2e6*30e-9=63kHz
- EC trigger rate for “baffle BaBar more1”
  - 35MHz without EC photon block
  - 15MHz with EC photon block
  - The main difference is photon trigger between 0.5-1GeV, we need to understand better how trigger behaves at such lowE

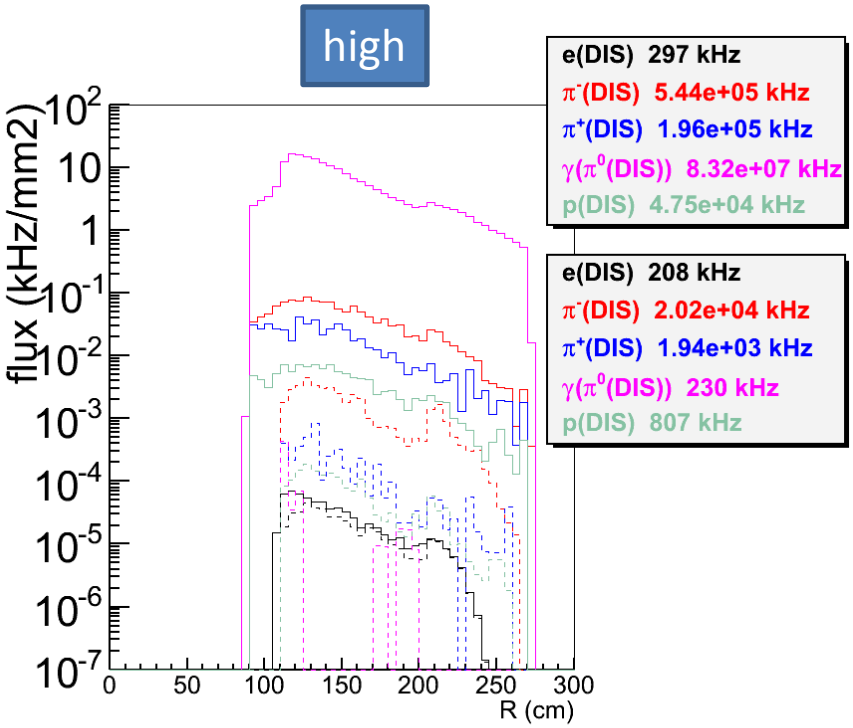
Rate before and after trig cut (More1 with more1 trig)

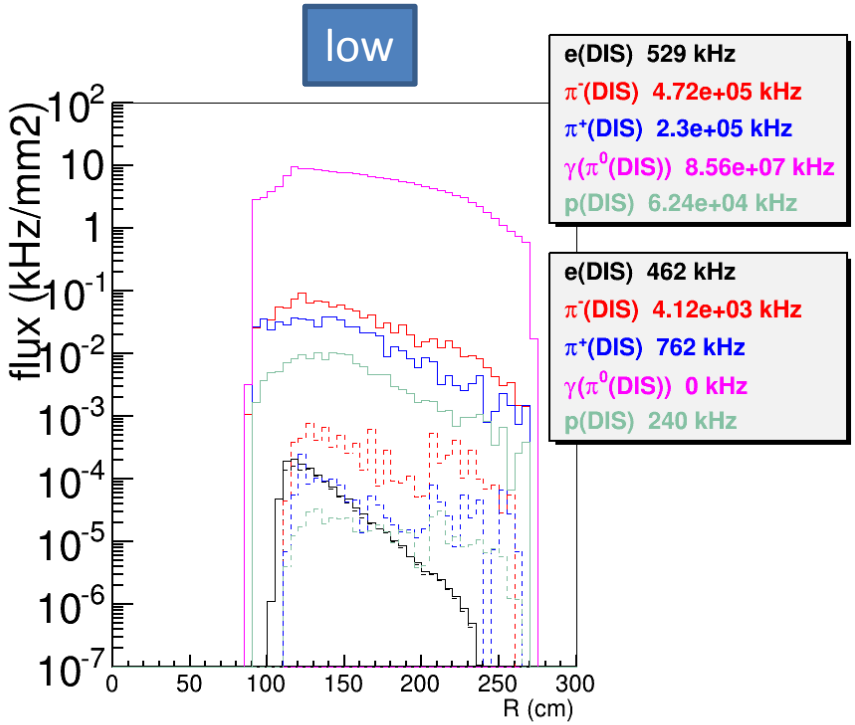




- Next slide shows the cut effect in “log(Ek) vs R”

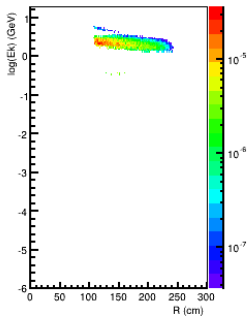
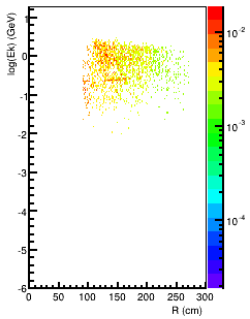
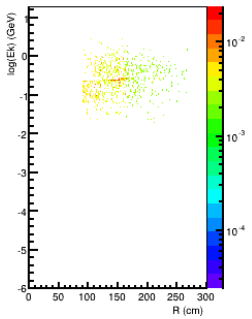
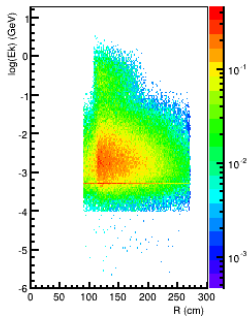
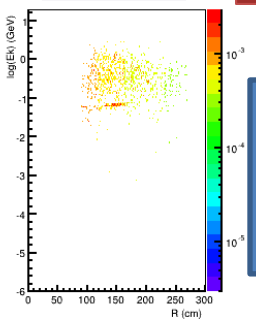
Rate before and after trig cut (More1 block with more1 trig)



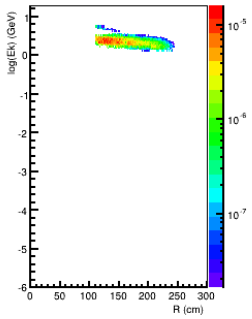
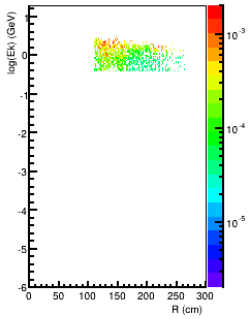
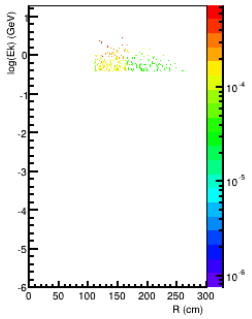
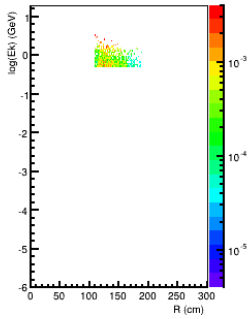
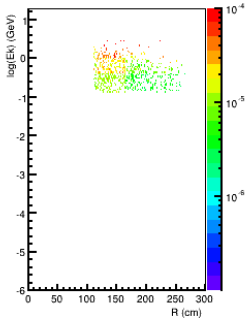


- Next slide shows the cut effect in “log(Ek) vs R”

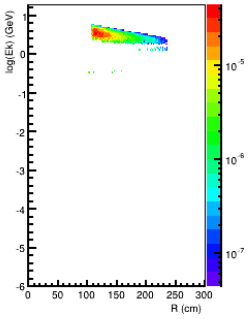
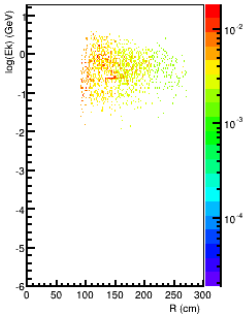
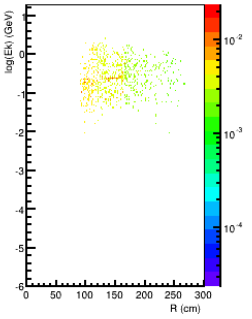
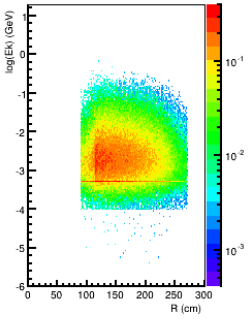
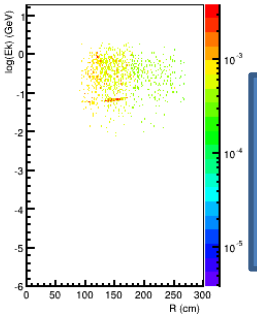
e DIS | pi- | pi+ | γ(pi0) | p | More1

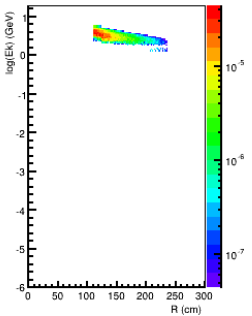
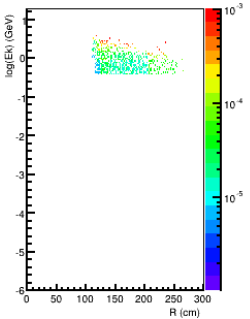
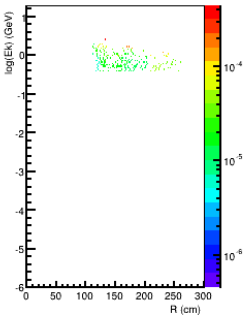
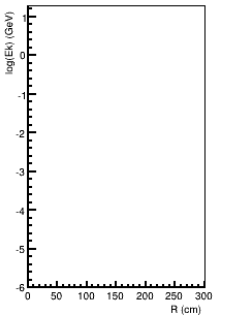
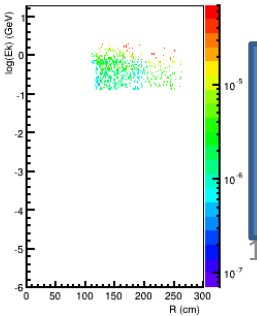
high, Before cut

High, After cut

Low, Before cut

Low, After cut

e DIS

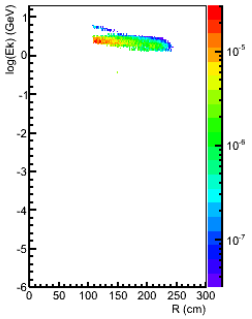
pi-

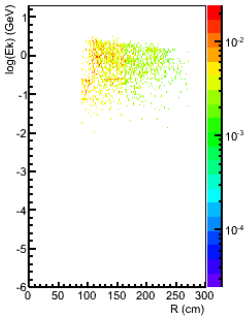
pi+

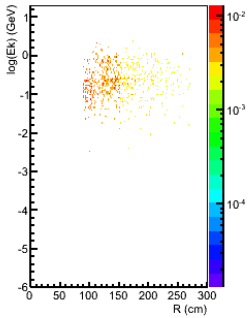
γ(pi0)

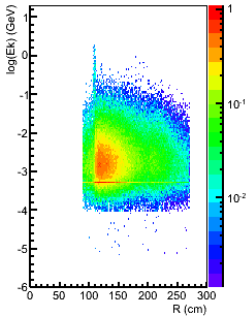
p

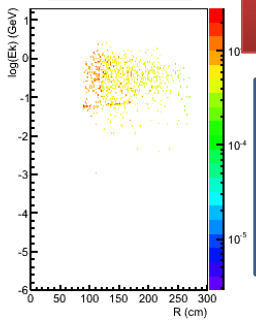
More1 block



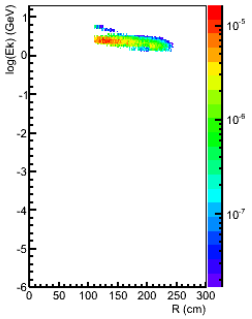


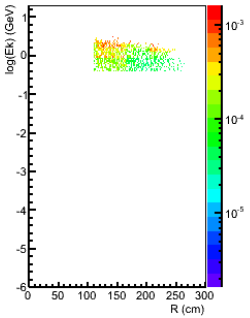


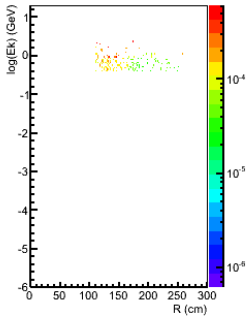


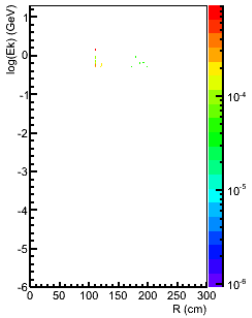


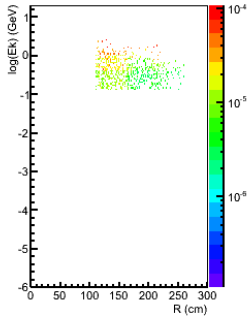
high, Before cut



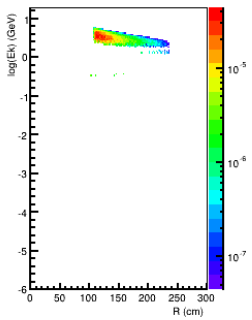


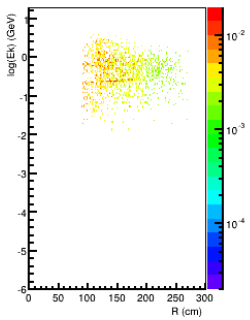


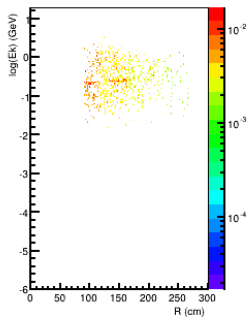


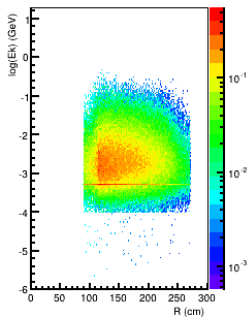


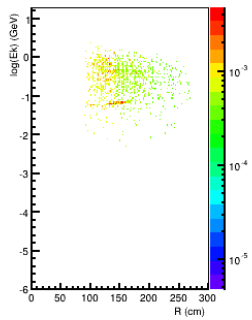
High, After cut



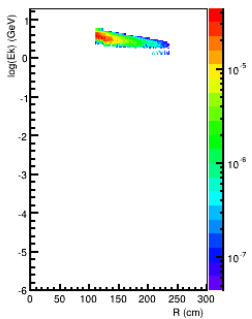


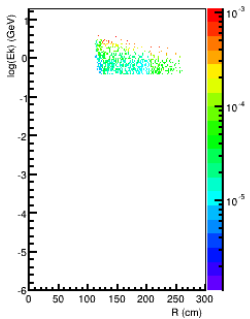


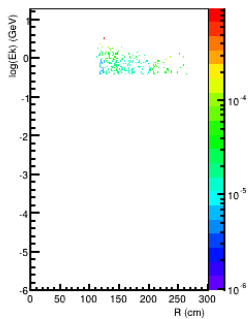


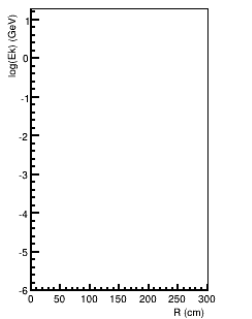


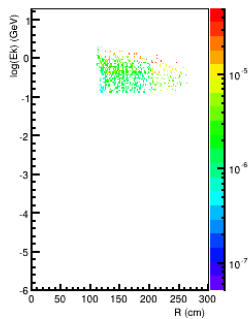
Low, Before cut











Low, After cut

Rate vs R (more1,lead)

R(cm)	100-116	116-124	124-165	165-205	205-265
eDIS	1.38e+01	3.16e+01	8.90e+01	5.58e+01	1.53e+01
π-	1.24e+04	3.27e+04	1.42e+05	8.42e+04	4.47e+04
π+	5.26e+03	1.19e+04	5.15e+04	2.29e+04	1.26e+04
$\gamma(\pi^0)$	1.08e+06	3.38e+06	1.29e+07	9.51e+06	6.91e+06
p	7.53e+02	2.64e+03	1.22e+04	6.91e+03	3.92e+03
total					
eDIS	3.77e+00	1.39e+01	5.93e+01	3.64e+01	1.48e+01
π-	3.12e+02	1.43e+03	6.09e+03	1.91e+03	2.01e+03
π+	4.07e+01	1.55e+02	7.13e+02	1.66e+02	1.08e+02
$\gamma(\pi^0)$	9.83e+02	3.14e+03	8.69e+03	2.97e+02	0.00e+00
p	9.09e+00	4.24e+01	2.66e+02	7.99e+01	5.36e+01
total					

Rate vs R (more1 block,lead)

R(cm)	100-116	116-124	124-165	165-205	205-265
eDIS	1.10e+01	2.49e+01	6.69e+01	3.04e+01	1.53e+01
π-	1.30e+04	2.90e+04	1.18e+05	6.73e+04	4.43e+04
π+	4.65e+03	1.13e+04	4.79e+04	2.06e+04	1.37e+04
$\gamma(\pi^0)$	2.23e+06	6.26e+06	1.84e+07	7.83e+06	6.90e+06
p	1.30e+03	2.46e+03	1.07e+04	5.59e+03	3.70e+03
total					
eDIS	3.39e+00	1.20e+01	5.09e+01	2.29e+01	1.48e+01
π-	3.19e+02	1.18e+03	5.15e+03	1.43e+03	2.00e+03
π+	7.13e+01	1.11e+02	5.52e+02	1.38e+02	9.96e+01
$\gamma(\pi^0)$	7.69e+01	2.02e+01	0.00e+00	1.81e+01	0.00e+00
p	1.52e+01	4.87e+01	2.18e+02	6.17e+01	6.05e+01
total					

PVDIS setup