FAC Test at SPring-8

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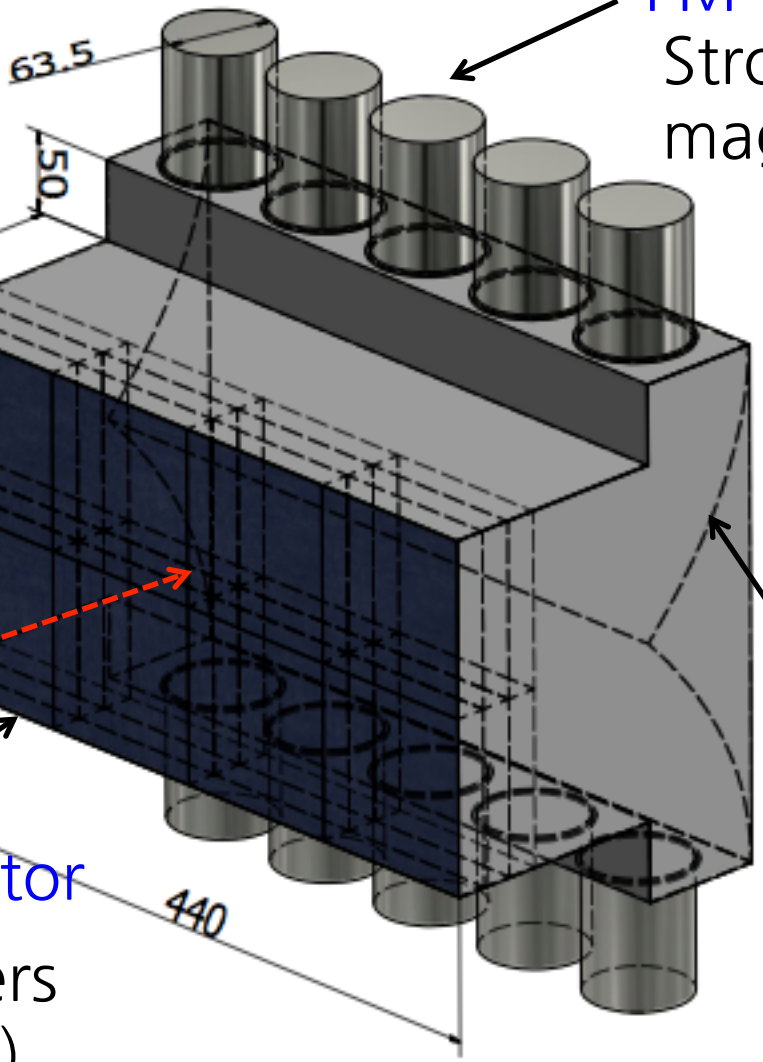
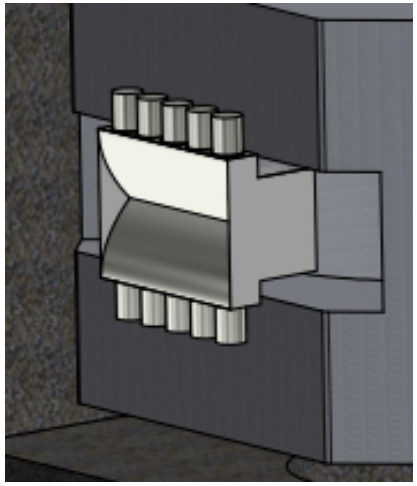
Forward Aerogel Cherenkov Detector

For online rejection of pions against kaon signals.

Light box
Thin Al plate

FM-PMT
Strong to magnetic field





Reflector surface

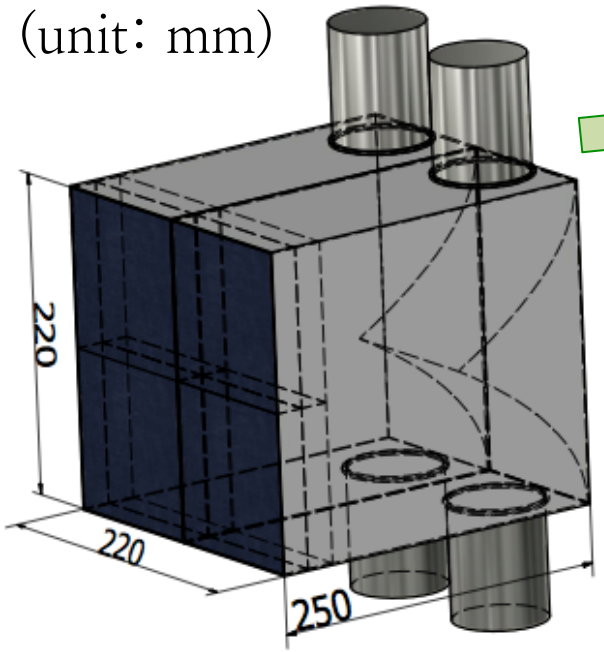
Parabola shape
Specular reflection

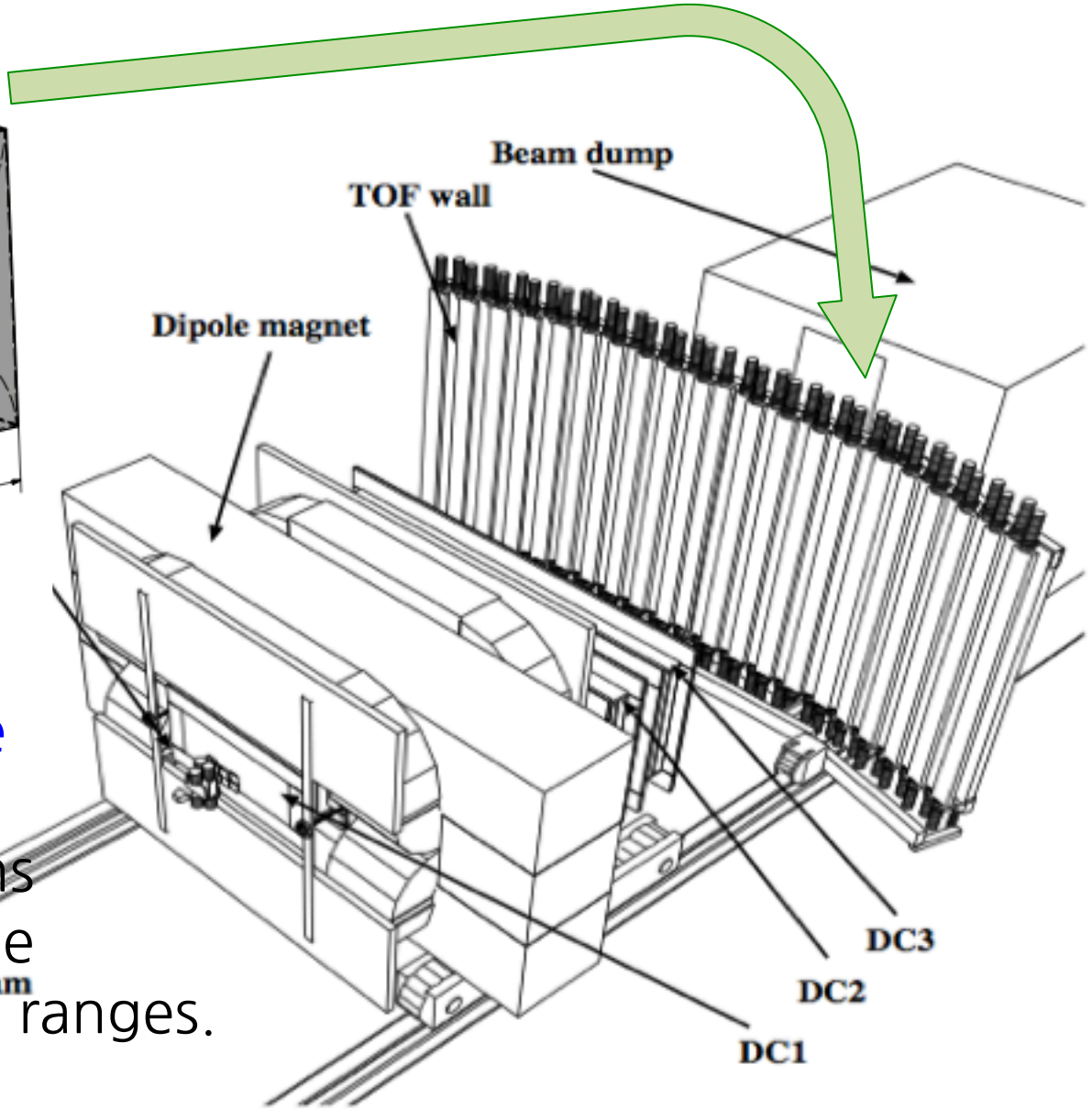
(unit: mm)

Aerogel radiator

n=1.04 3 layers
(20 mm/layer)

FAC LEPS Test Experiment

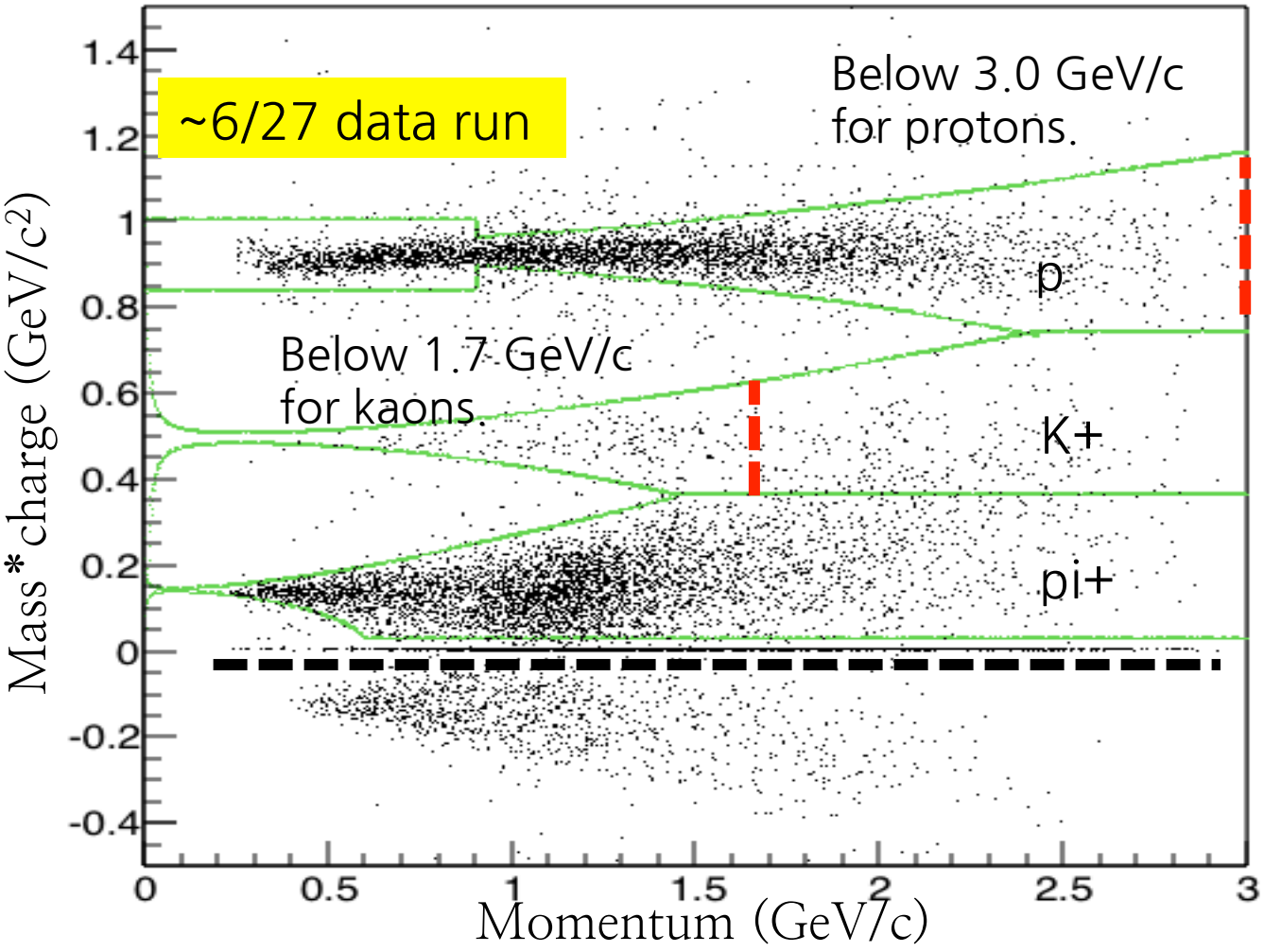




FAC performance test experiment using pions, kaons and protons in the wide momentum ranges.

Cut Condition

We used sqrt(pm^2±2*σ_{m^2}) due to the existence of particles which have wrong tracking information around pm*qq=0(black dashed line).



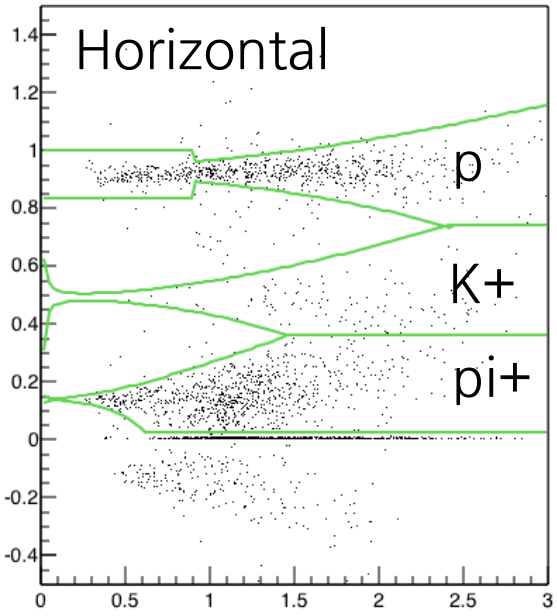
Horizontal, Vertical FAC Direction

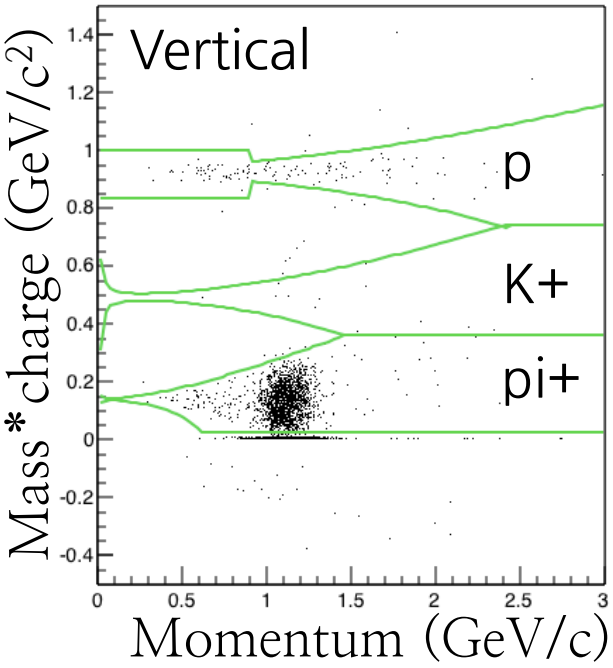
Partial data run

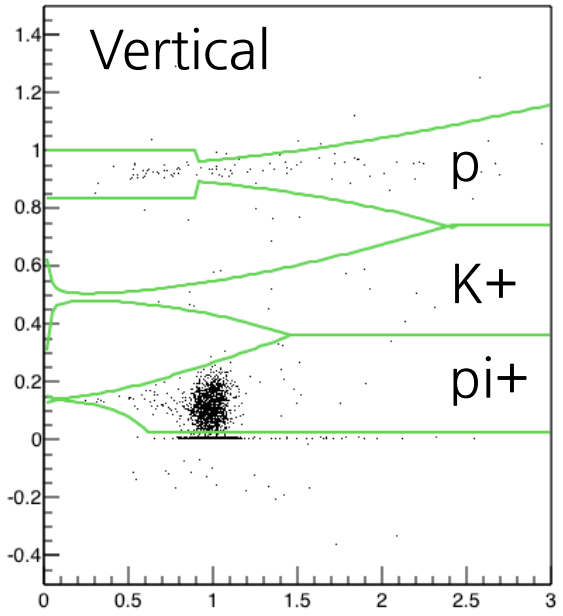
480<$X_{aerogel}$<700 mm
-115<$Y_{aerogel}$<-225 mm

600<$X_{aerogel}$<710 mm
-110<$Y_{aerogel}$<110 mm

700<$X_{aerogel}$<810 mm
-110<$Y_{aerogel}$<110 mm







We can measure pions with specified momentum range with much more statistics per momentum range if we consider this specified momentum range.

Direction and condition is similar with E42.

Horizontal, Vertical FAC Direction

Partial data run

480<$X_{aerogel}$<700 mm
-115<$Y_{aerogel}$<-225 mm

600<$X_{aerogel}$<710 mm
-110<$Y_{aerogel}$<110 mm

700<$X_{aerogel}$<810 mm
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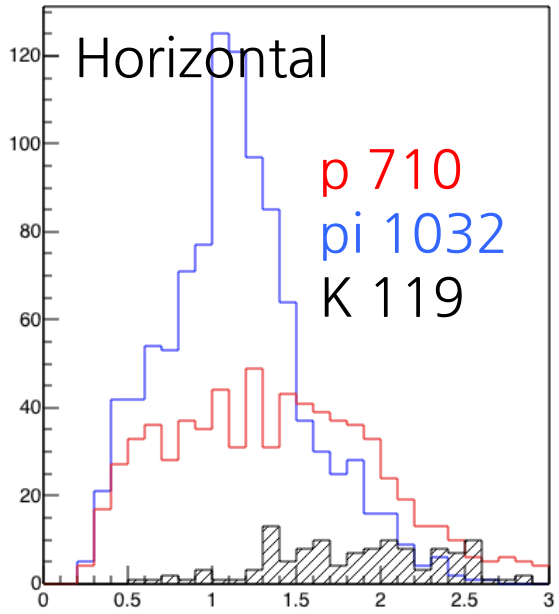
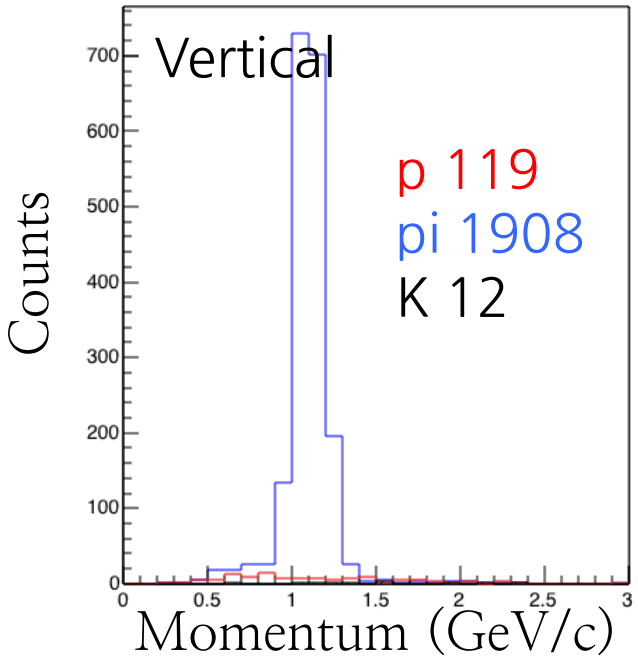
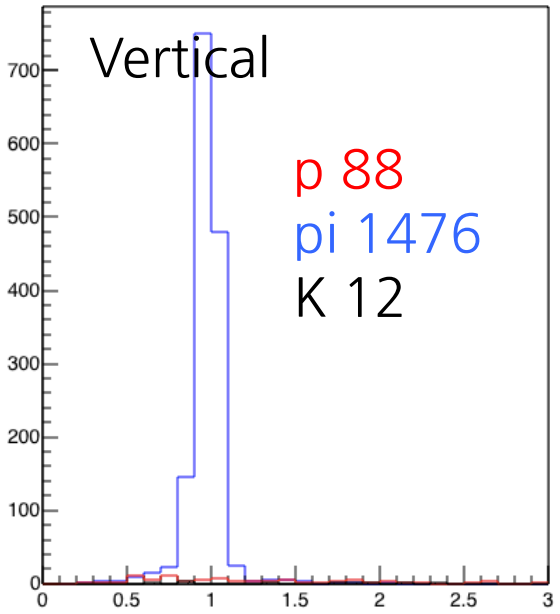
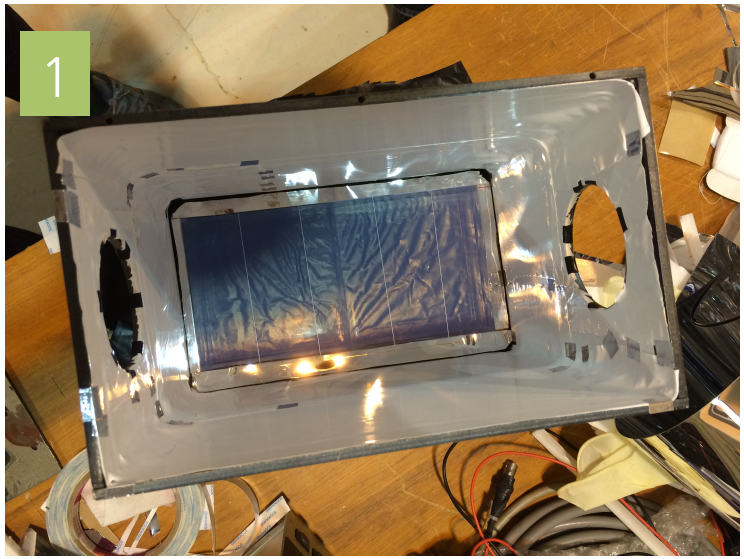


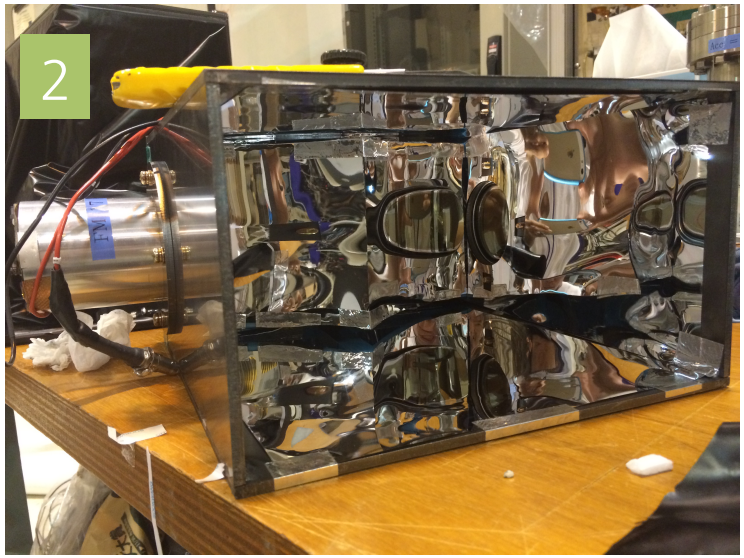


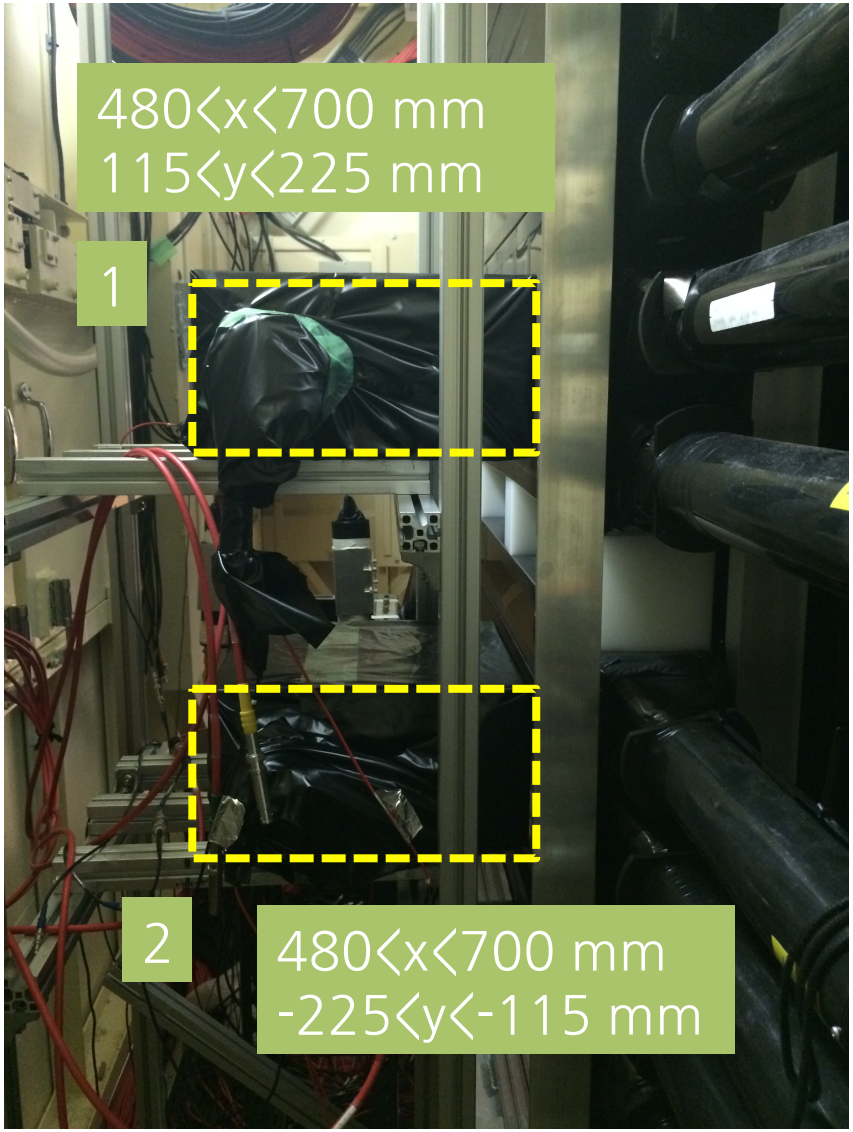


But few proton, kaon statistics is expected and vertical direction FAC can't be free from electron background.

FAC Installation







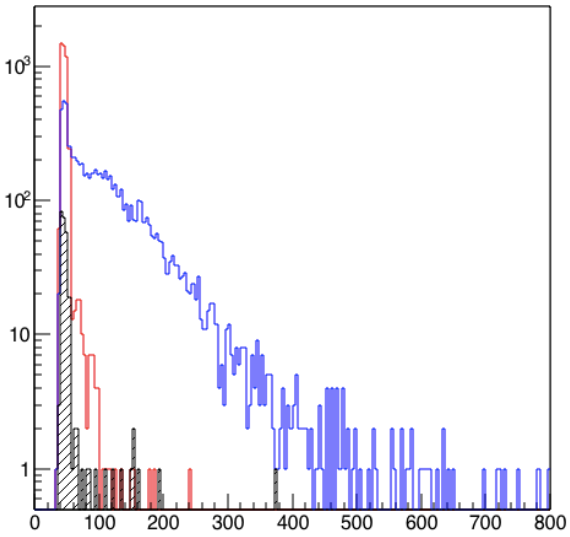
115 mm

ADC Distribution

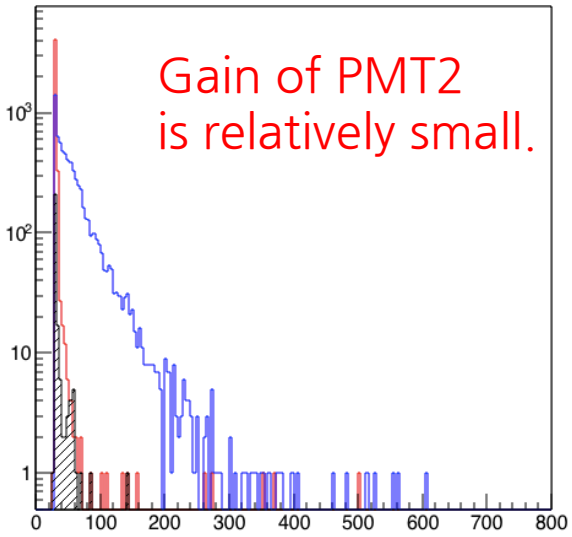
~6/27 data run

Parabola FAC

Proton: 3370
Pion: 6856
Kaon: 255



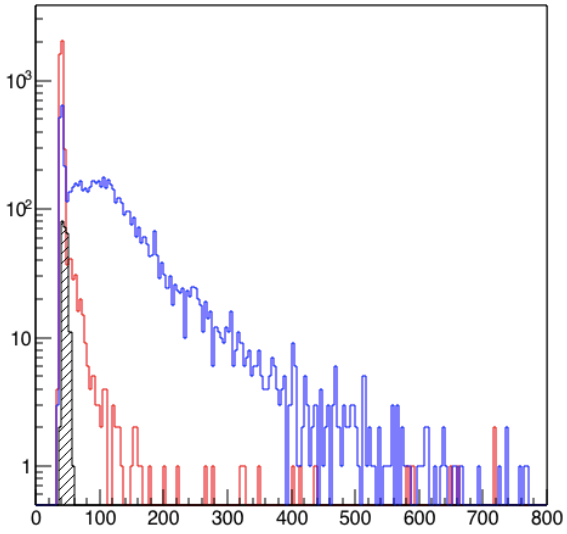
PMT 1



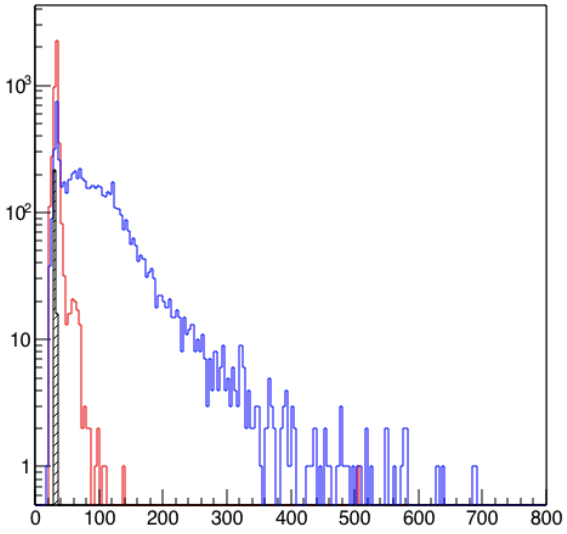
PMT 2

Teflon FAC

Proton: 3151
Pion: 6396
Kaon: 232



PMT 3



PMT 4