Neutral Beam Line (K0) for E391a

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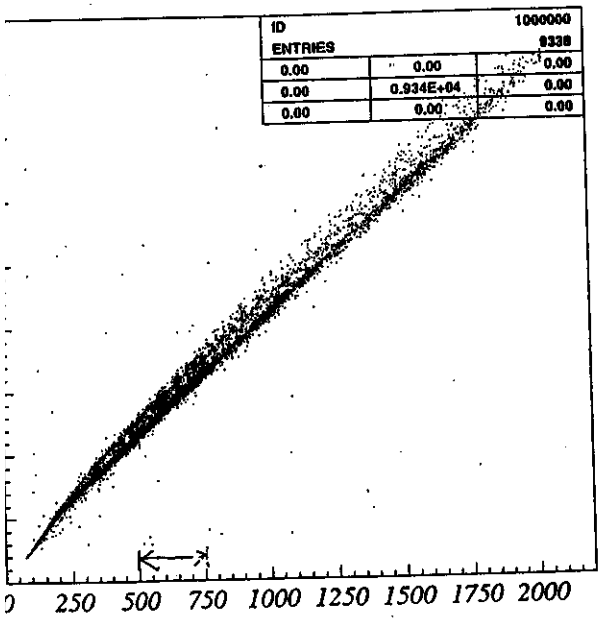
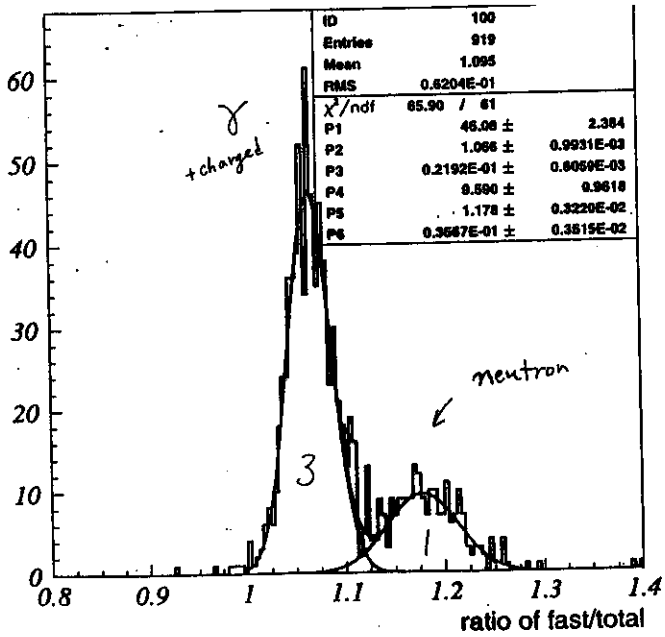
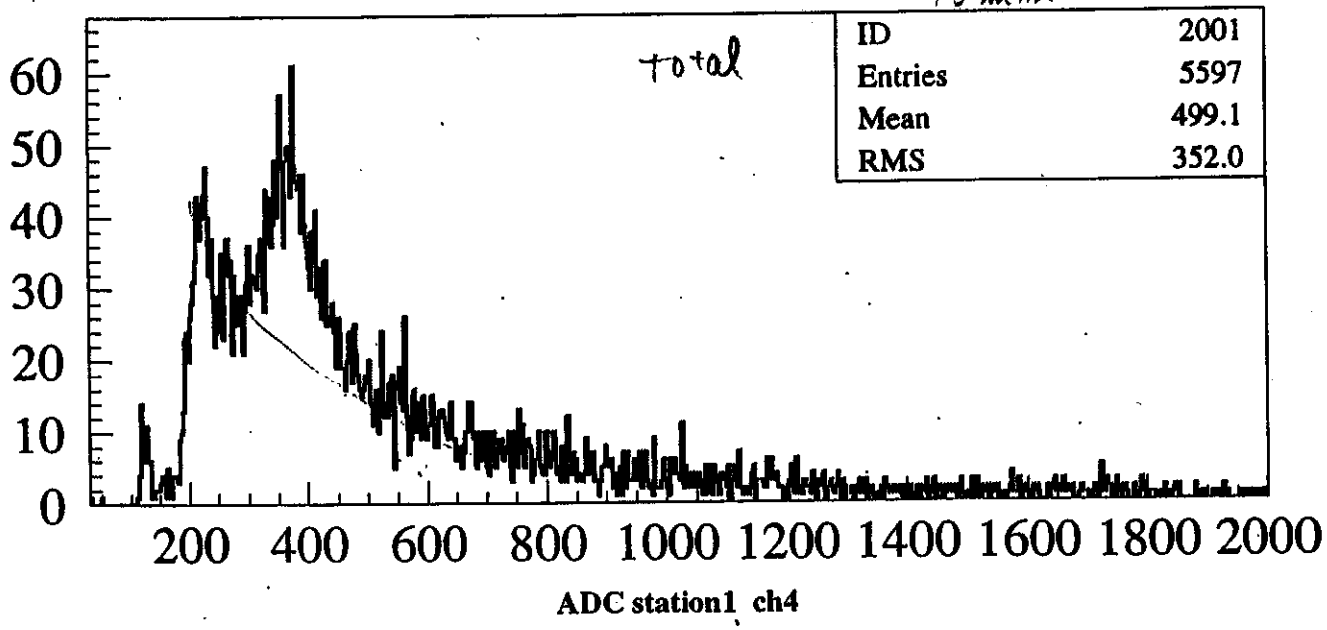
Kaon Decay Workshop – KEK – 14 Feb. 2001





2000/12/21 00.41

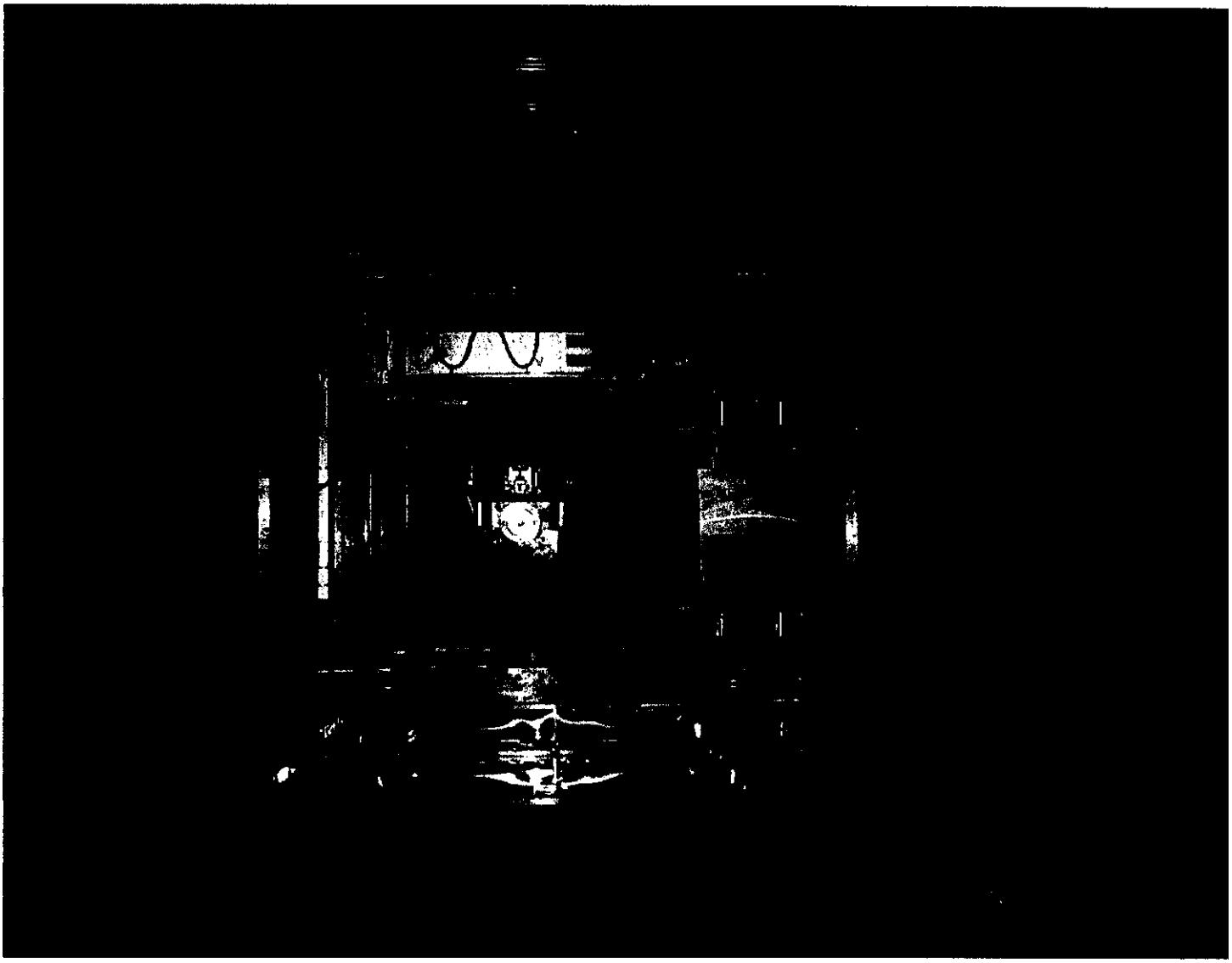
Run3651 Event5597 /~~600 sec~~ 10 min



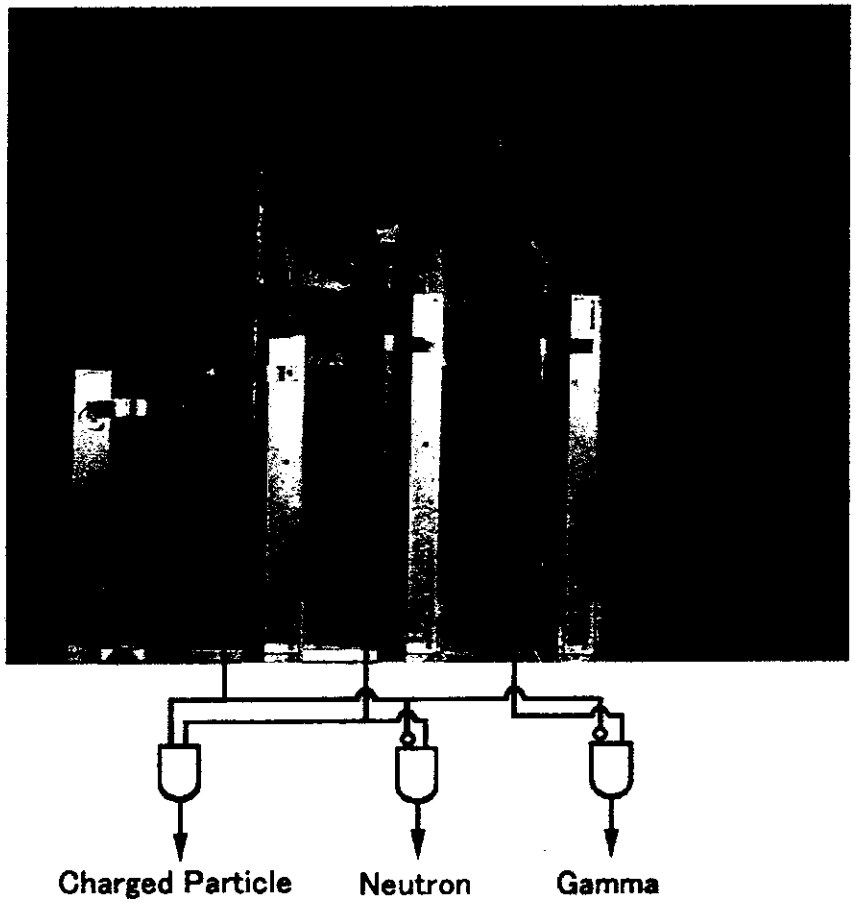
Beam Survey

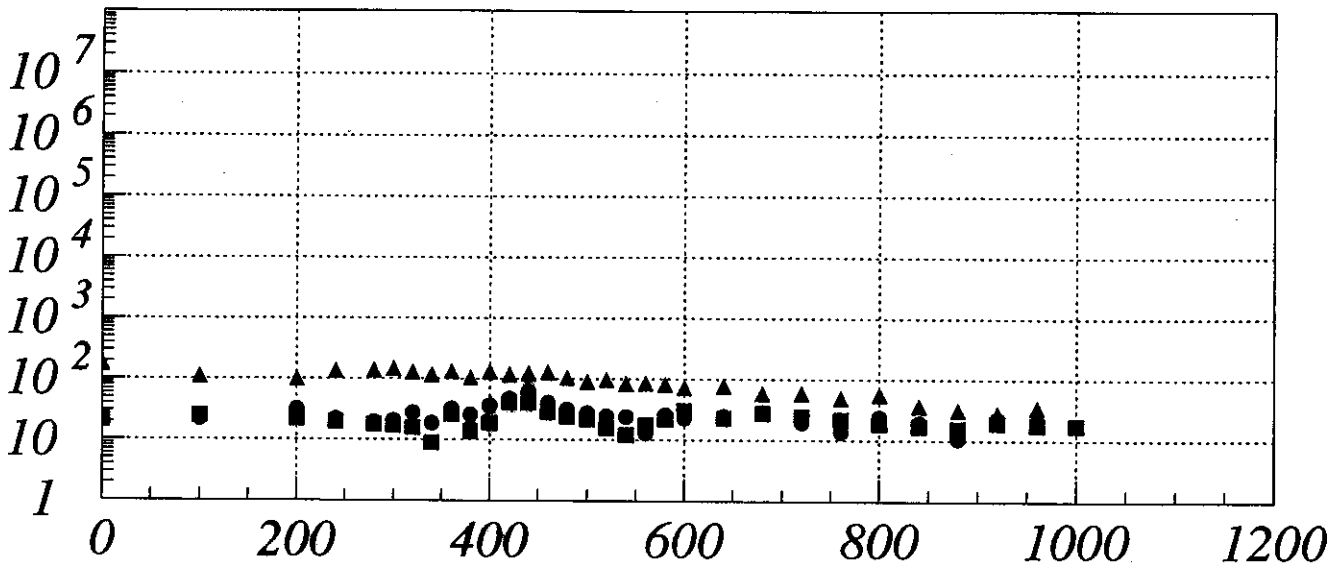
- Purpose of the Beam Survey
  - Understand the new built beamline
    - Profiles of particles
    - Energy distributions
    - Thermal neutron flux
    - Counts K_L (in order of magnitude)
    - Comparison with calculated results
- Survey
  - First – April, 2000
  - Second – Dec., 2000

    (Analysis is going on)

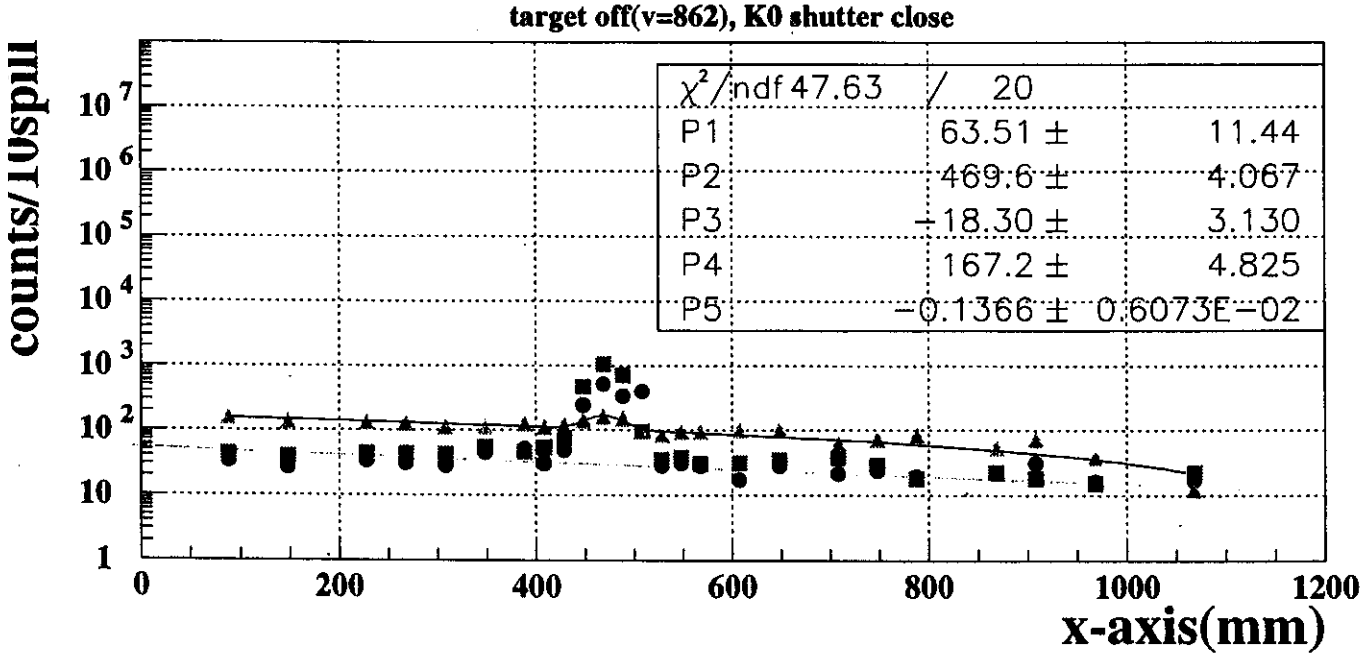


Detector setup for Profile Meas.

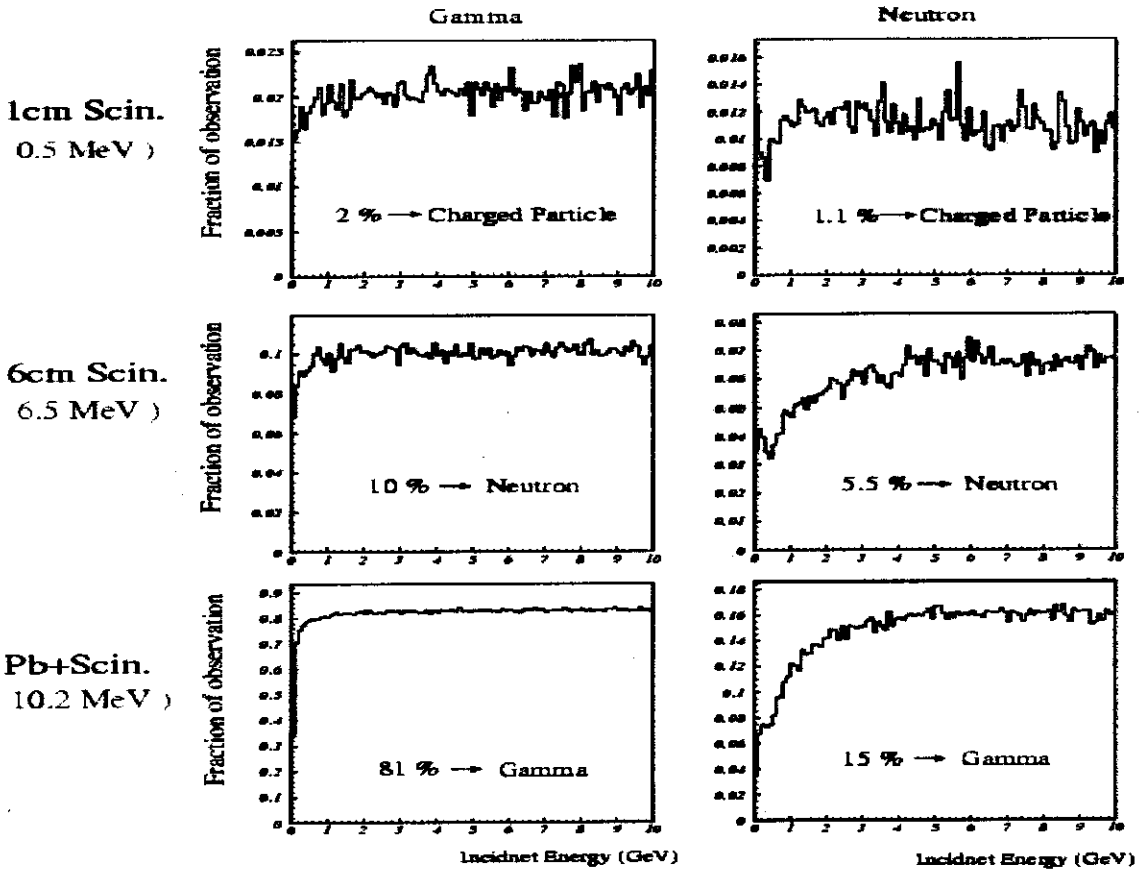



10 7
10 6
10 5
10 4
10 3
10 2
10
1
0
200
400
600
800
1000
1200

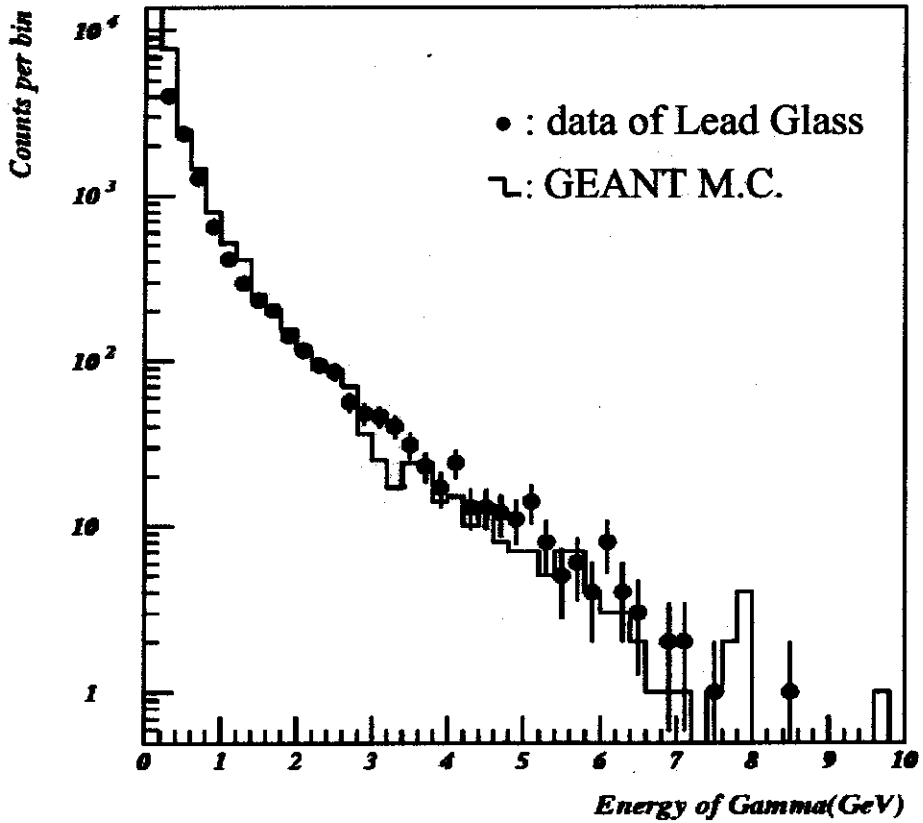
00/04/18 11.58


target off(v=862), K0 shutter close
counts/1Uspill
χ²/ndf 47.63 / 20
P1 63.51 ± 11.44
P2 469.6 ± 4.067
P3 −18.30 ± 3.130
P4 167.2 ± 4.825
P5 −0.1366 ± 0.6073E−02
10 7
10 6
10 5
10 4
10 3
10 2
10
1
0
200
400
600
800
1000
1200
x-axis(mm)

Detector Response

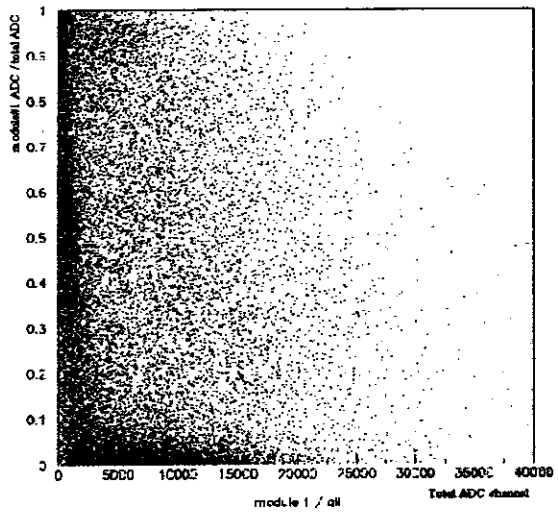


Energy Distribution of gamma



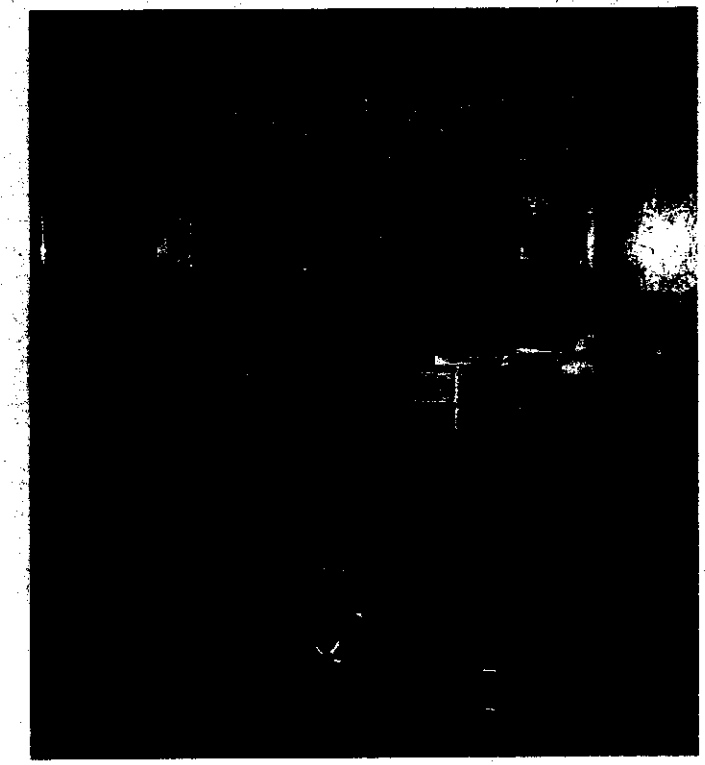
Cerberus – Hadron Calorimeter

- n/γ separation in GeV region
- Energy Distribution

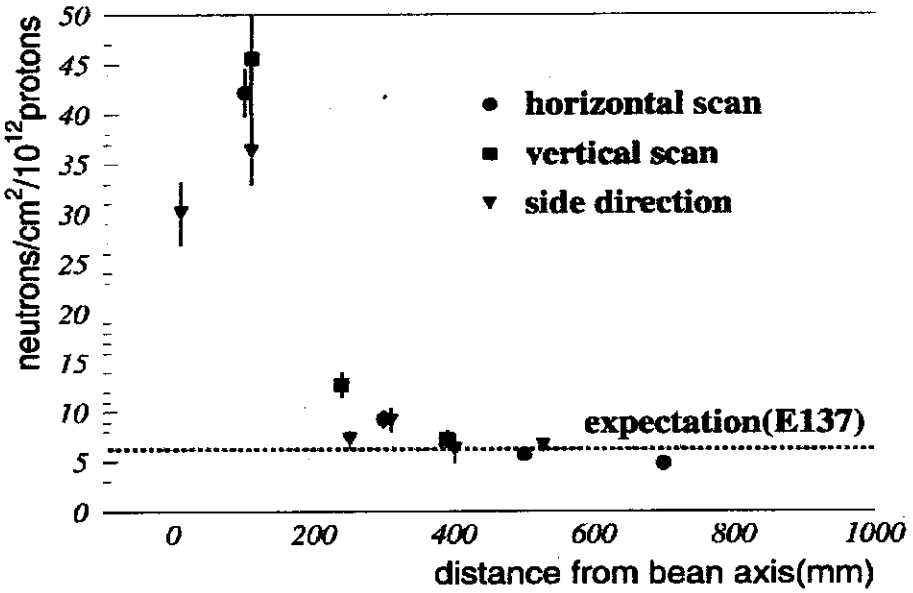


Analysis is going on

(Pb+Scin.) + 5(Fe+Scin.)



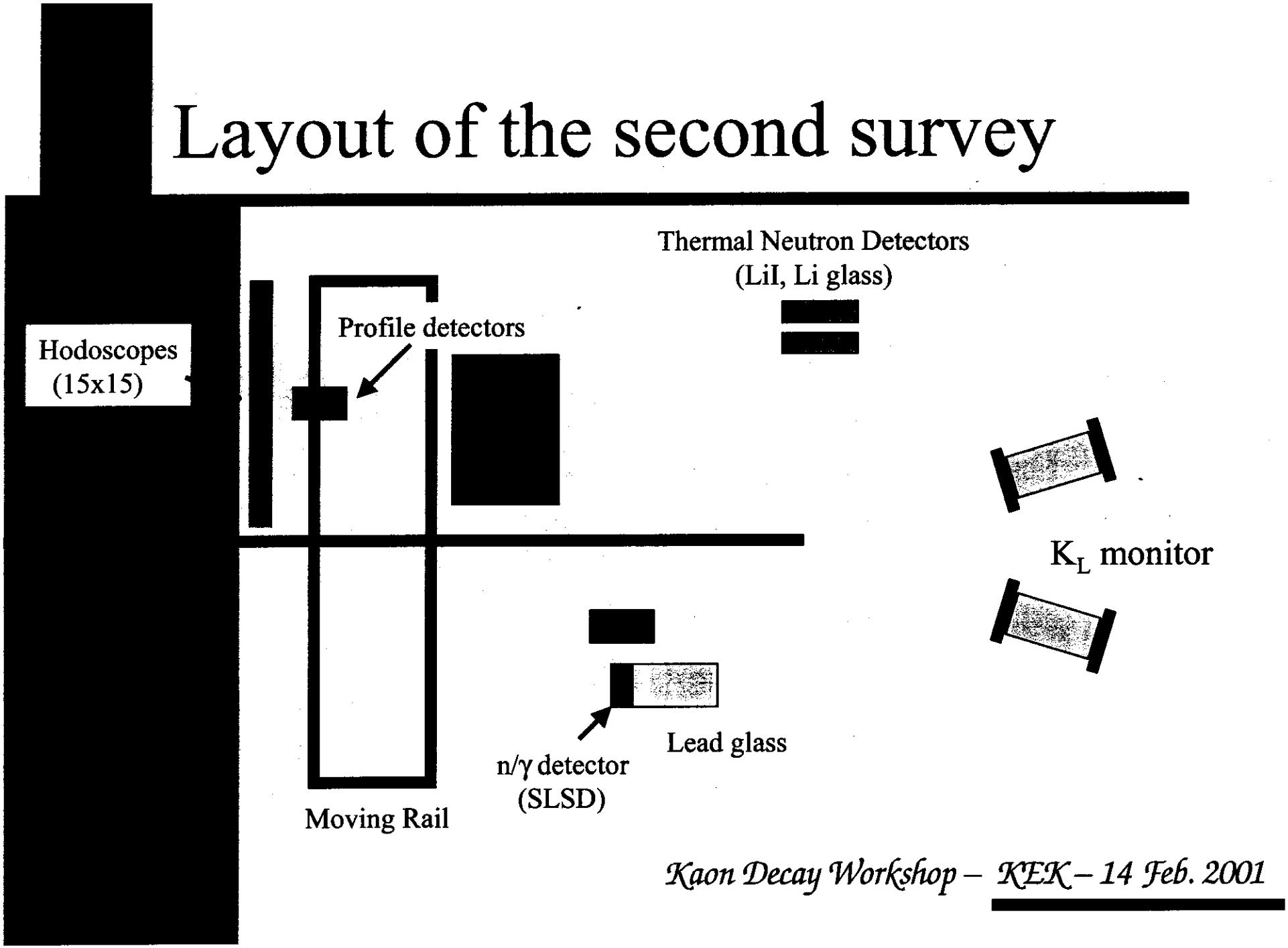
Thermal Neutron



Expected level: 130 neutrons $\times (2\text{mrad}/9\text{mrad})^2$

Center(<200mm) : enhance ×
Halo(>200mm) : same level as E137 ○
side direction ~ front direction

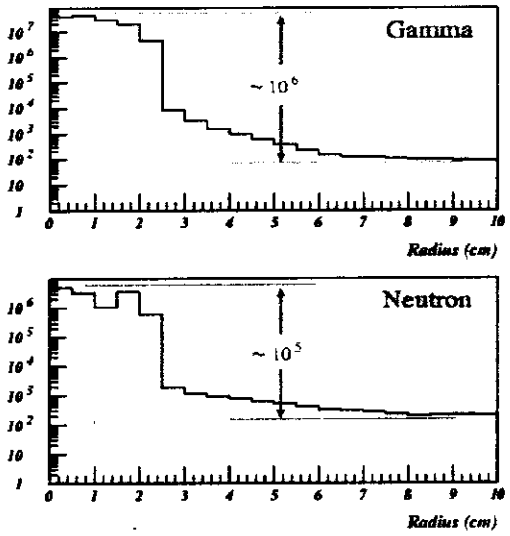
Layout of the second survey

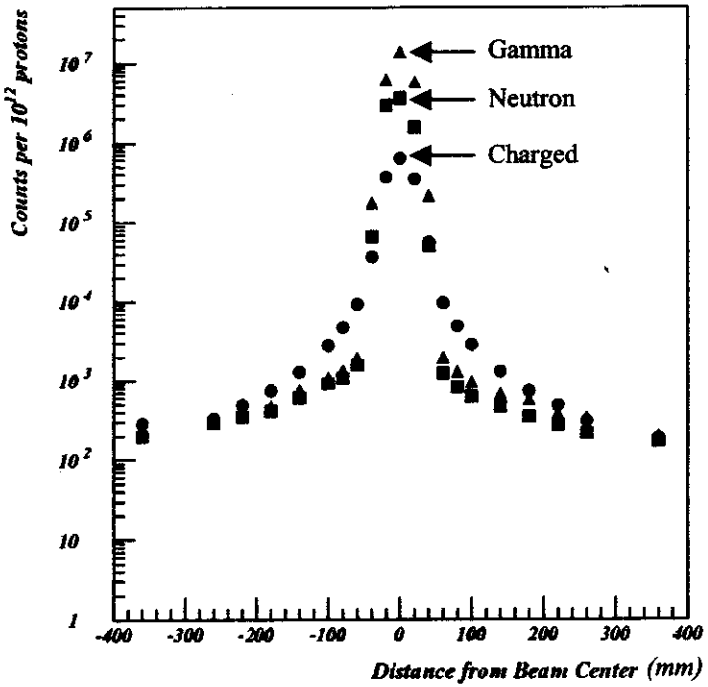


Profiles of particles

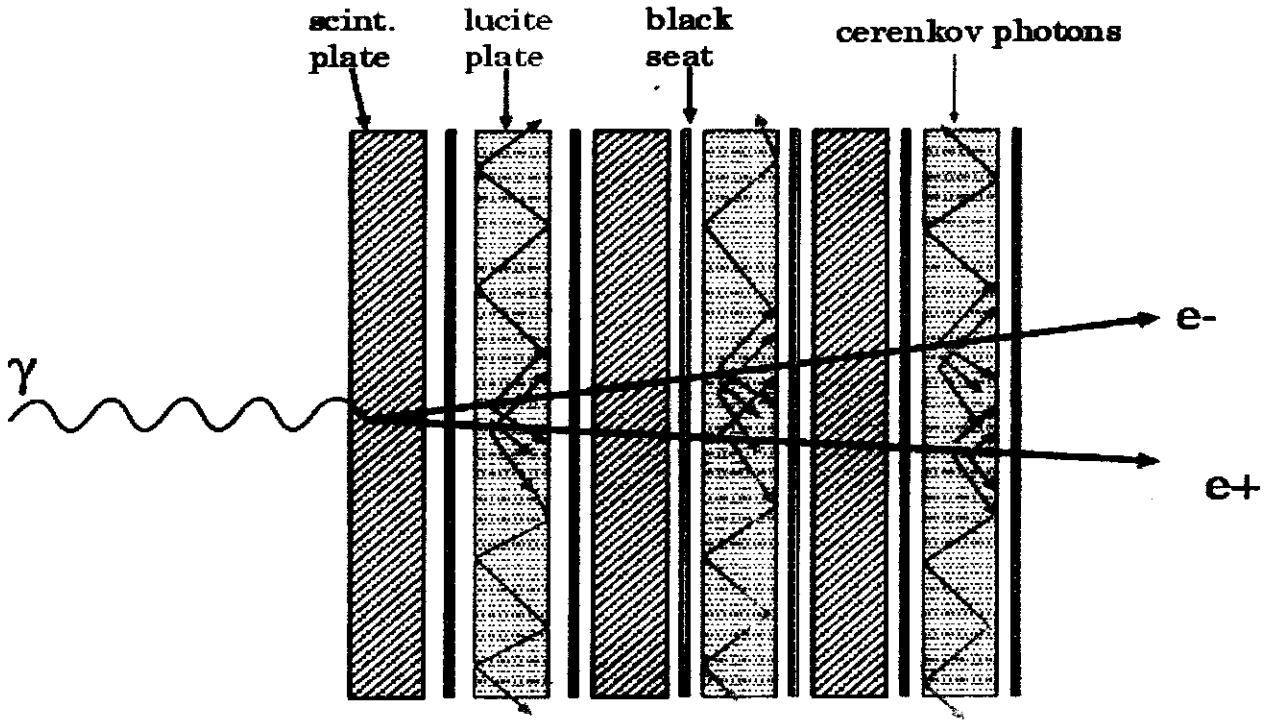
Detector Response
- Efficiency
- Size

Starting with M.C.





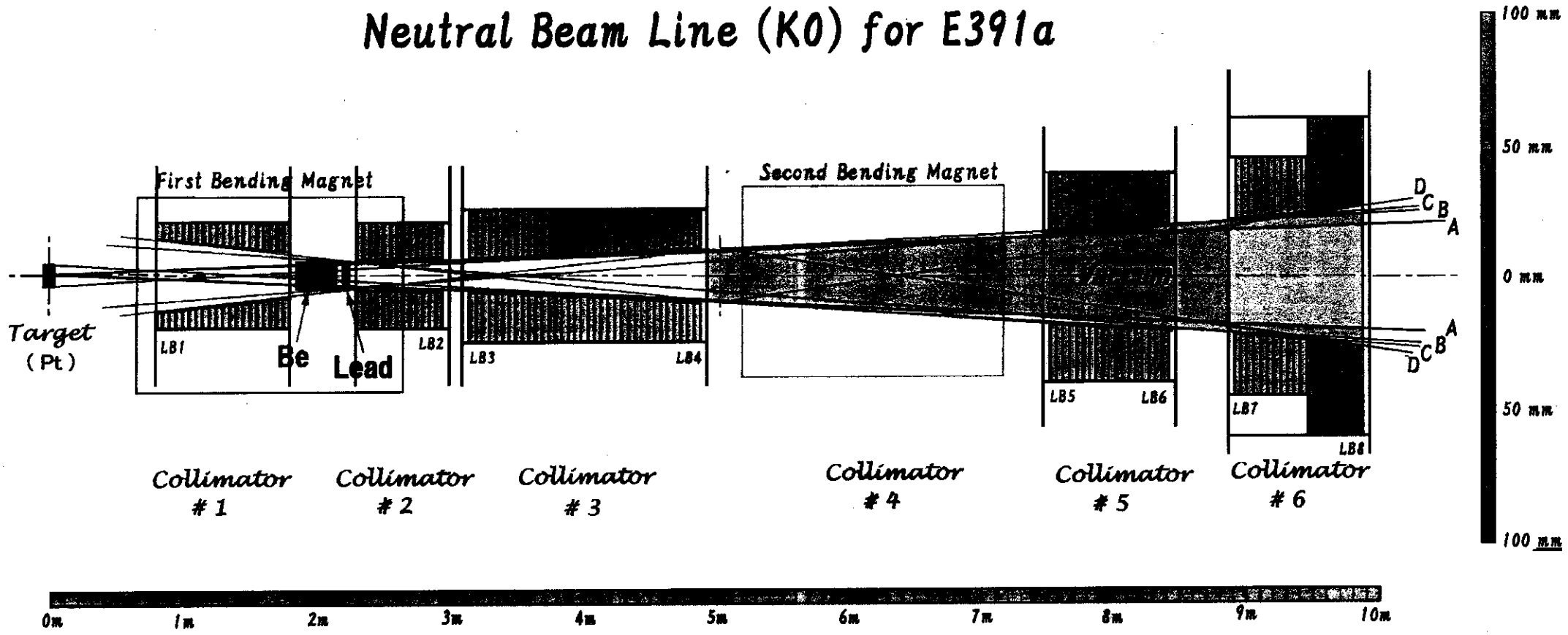
Scintillator Lucite Sandwich Detector

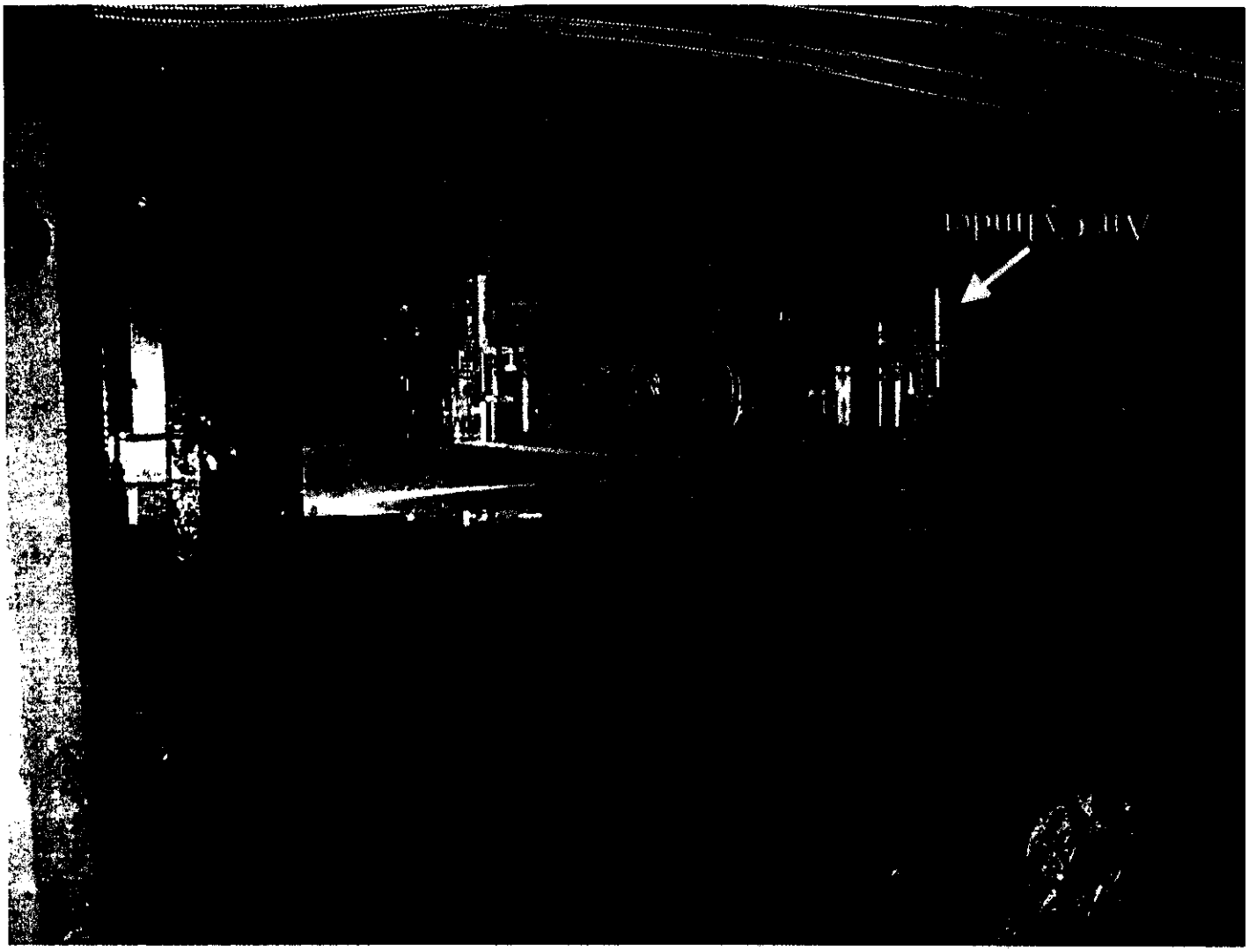


^{6}LiI(Eu)
CsI
SLSD
Cerberus

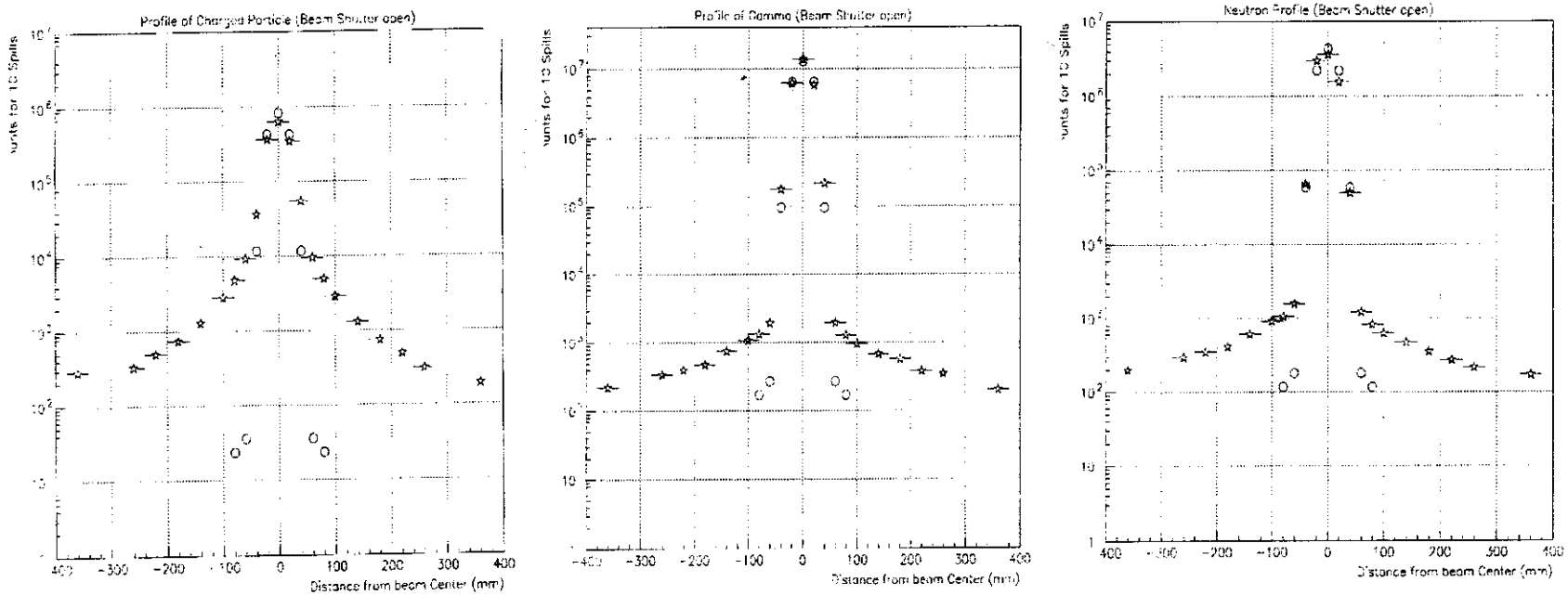
γ = Scinti. & Cerenkov photon

Neutral Beam Line (K0) for E391a



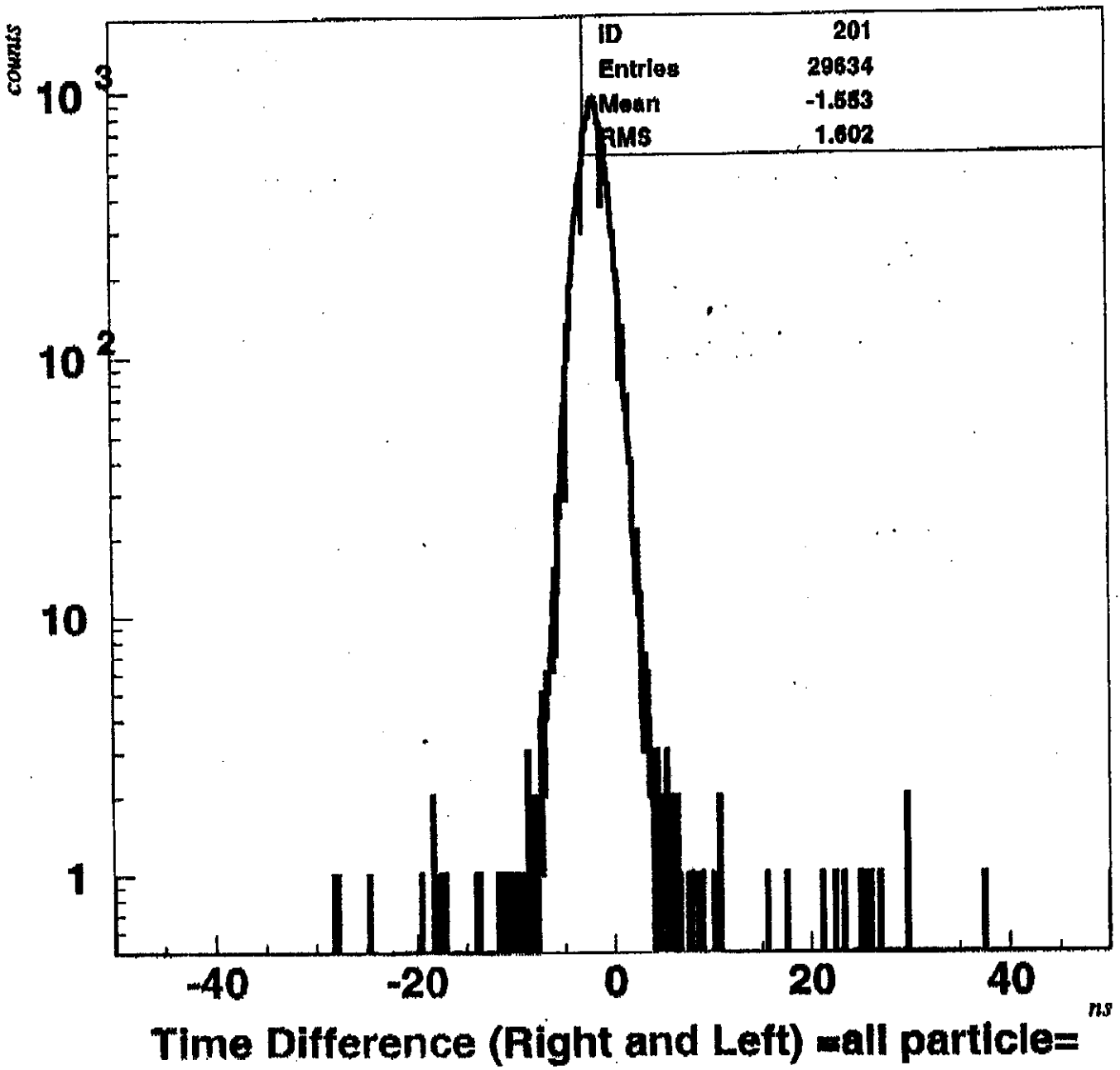


Agree with Simulation



Core region : Well re-produced even charged particle

Halo region : Charged particle dominated


counts
ID 201
Entries 29634
Mean -1.553
RMS 1.602
10 3
10 2
10
1
-40
-20
0
20
40
ns
Time Difference (Right and Left) =all particle=

Summary

- New neutral beamline (K0) was constructed
- Successful operation of the beam line
- Beam Survey
  - Agrees with calculation
  - Many kinds of data we obtained
    - Analysis is still going on
- Background estimation based on measured data

Ready for experiment !