

Study of
Low energy electron
filtering.

Nagoya-U.

A. Ariga.

Motivation.

There are low energy electrons.

ex. β -ray

Compton electron.

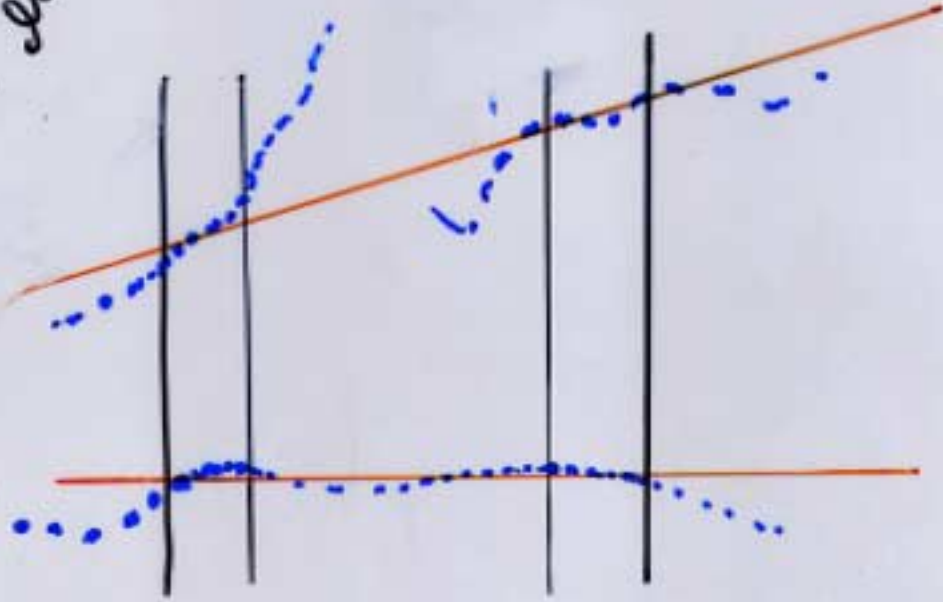
They are noise for

Track Selector.

They should be separated

And there's no data for
these energy levels,

except MC.

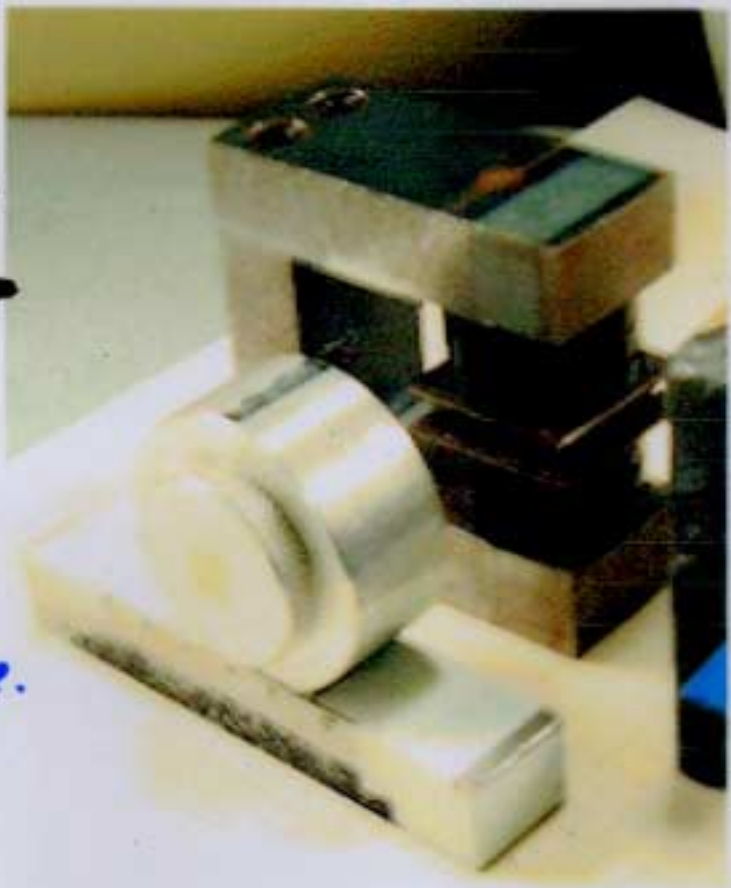


Contents.

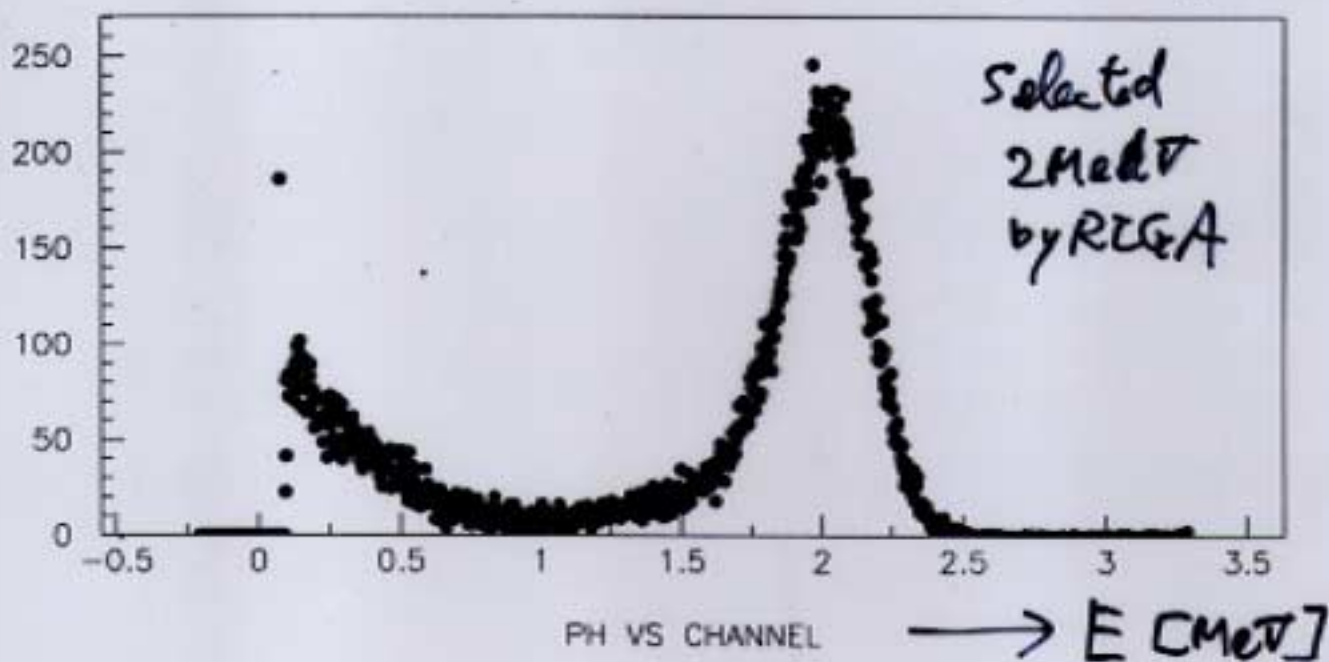
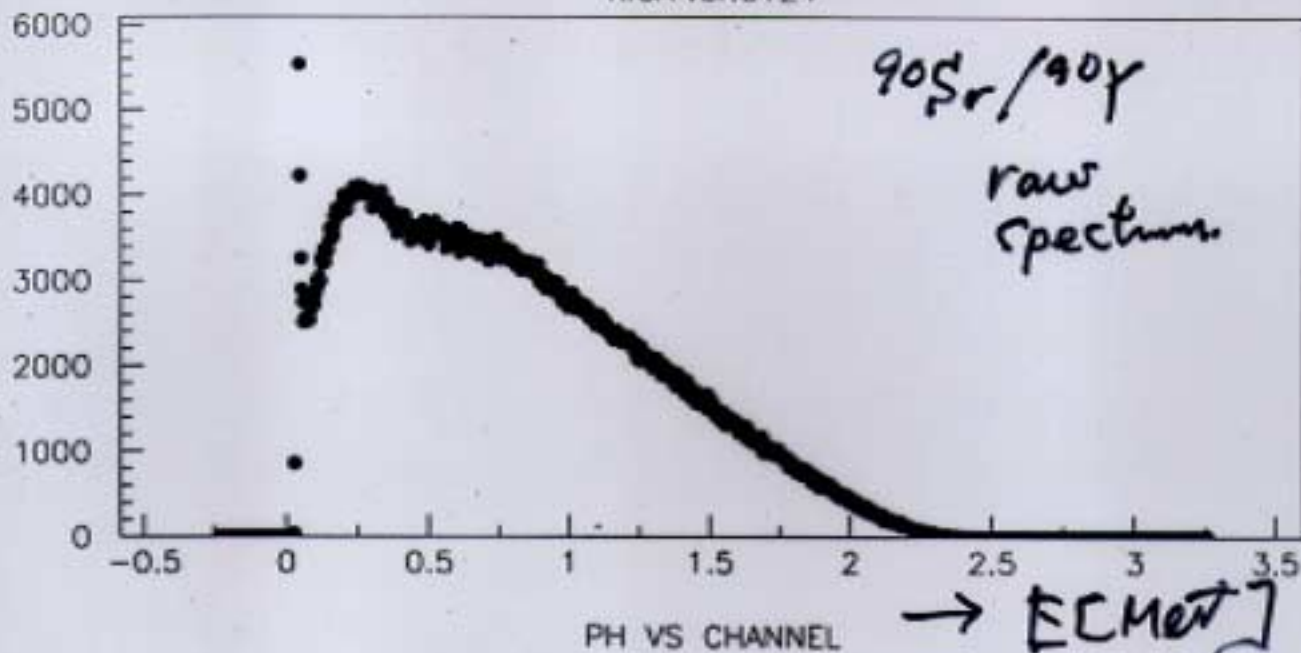
- Beam exposure. 1 MeV 2 MeV Horiz
by RIGA.
- Data taking
- Deviation from the best fit line
- Momentum measurement
by Multiple Coulomb Scattering

RIGA

Radio
Isotope
spectroGraph
in the Atmosphere.



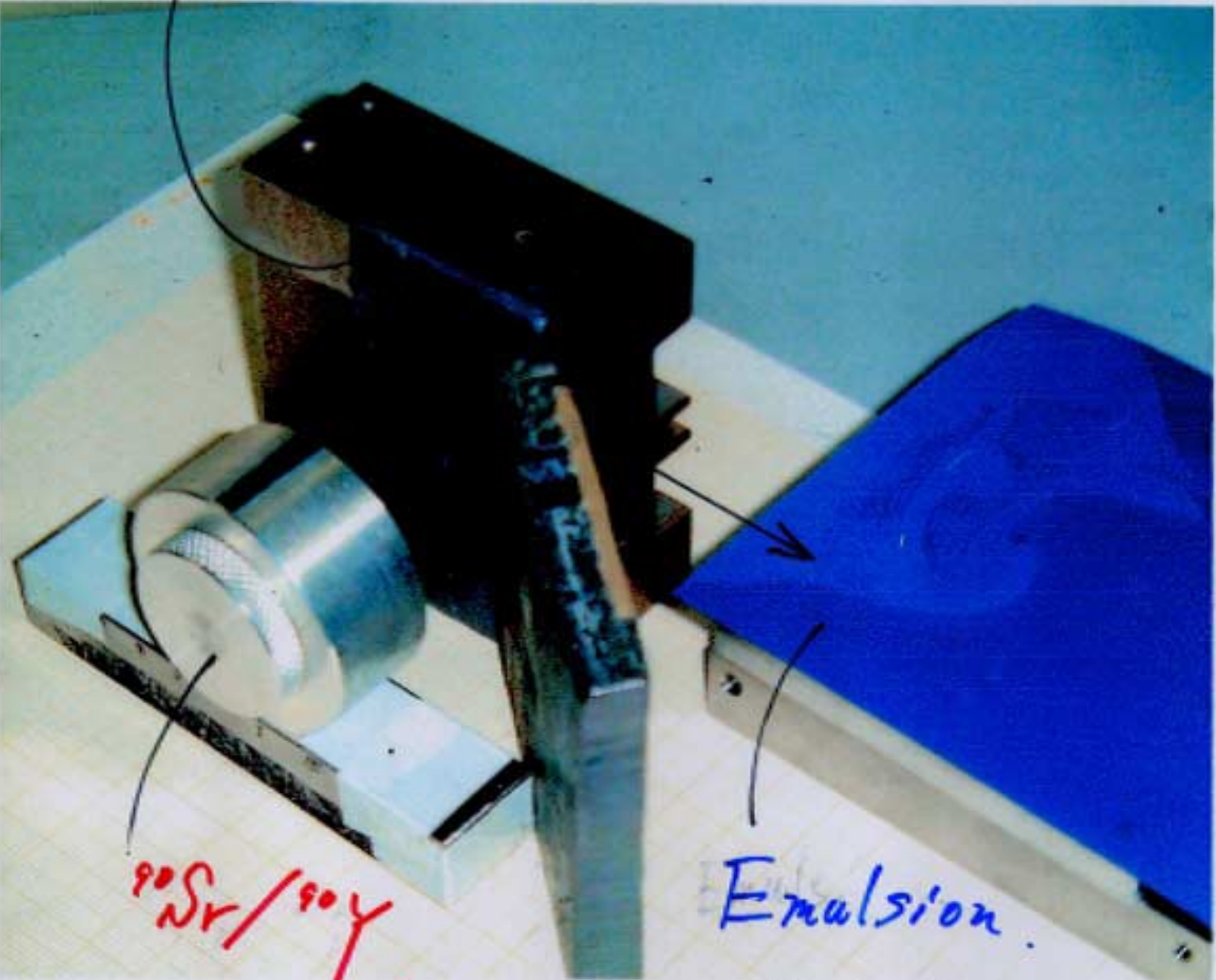
RIGA ver.0124



measured by plastic scintillator at Flab.

Beam Exposure

Collimator

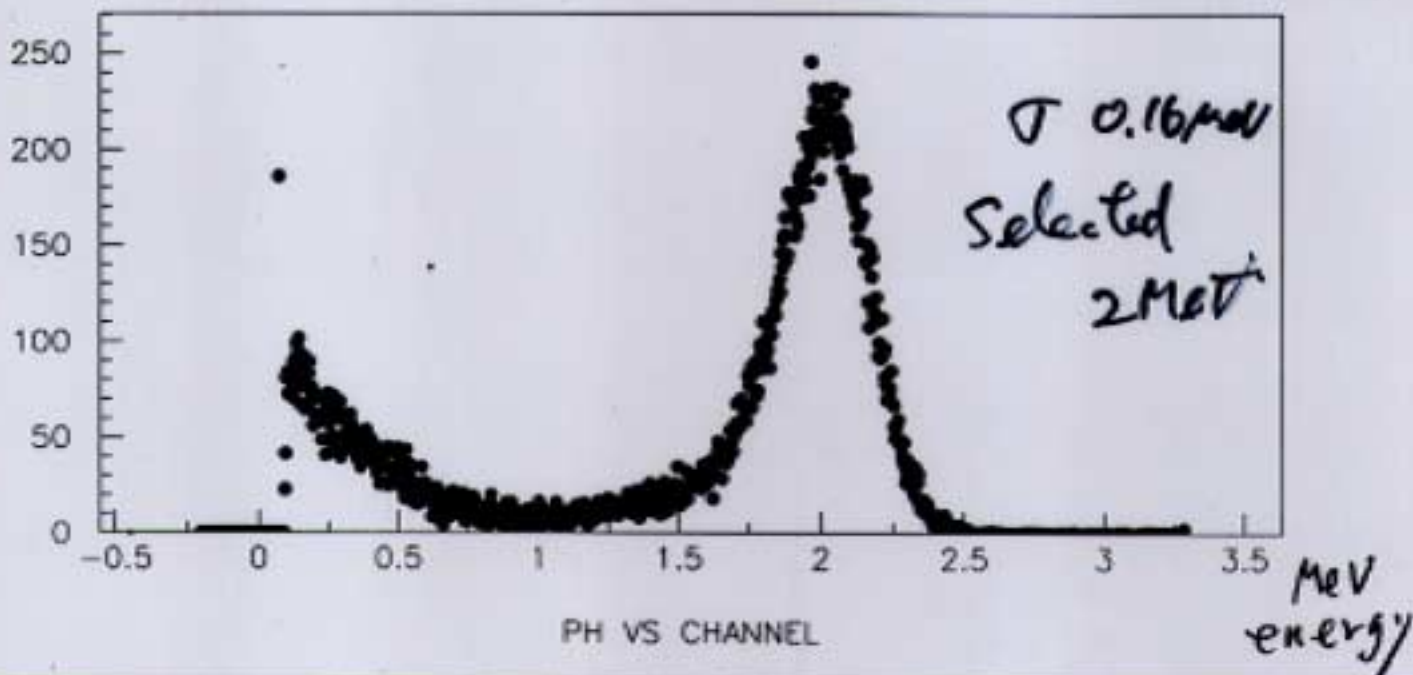
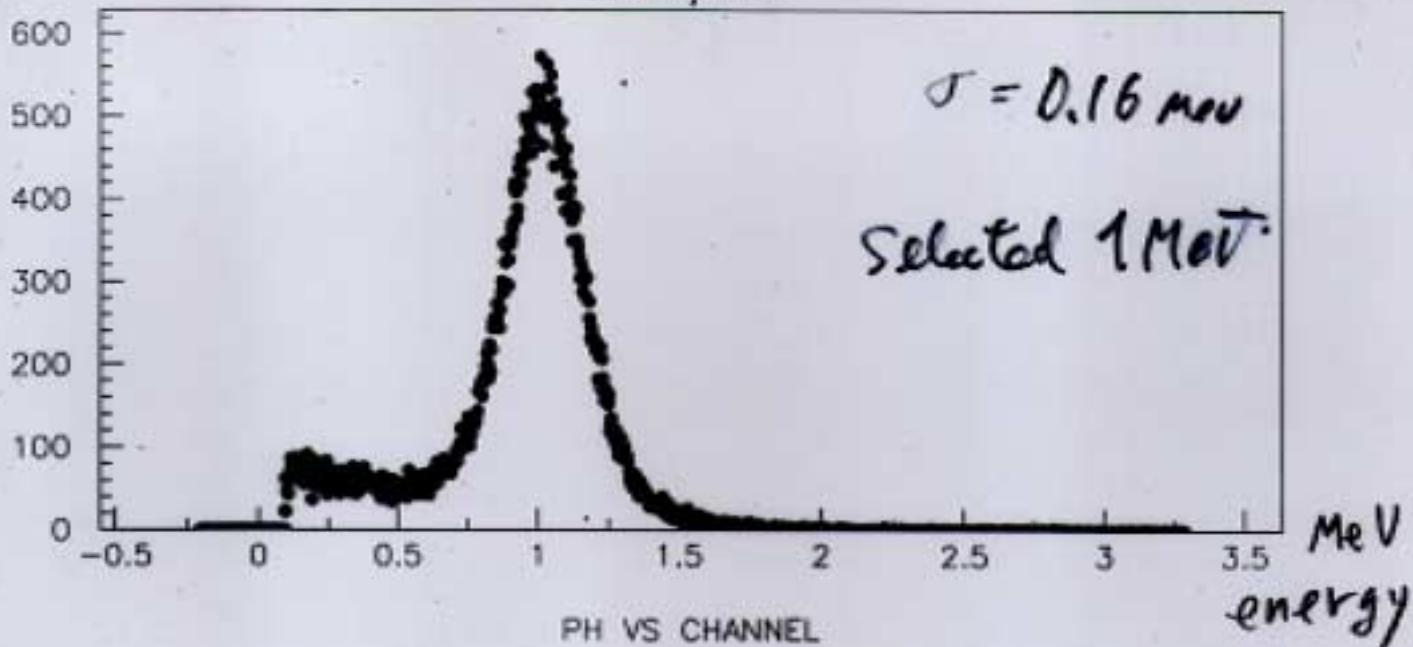


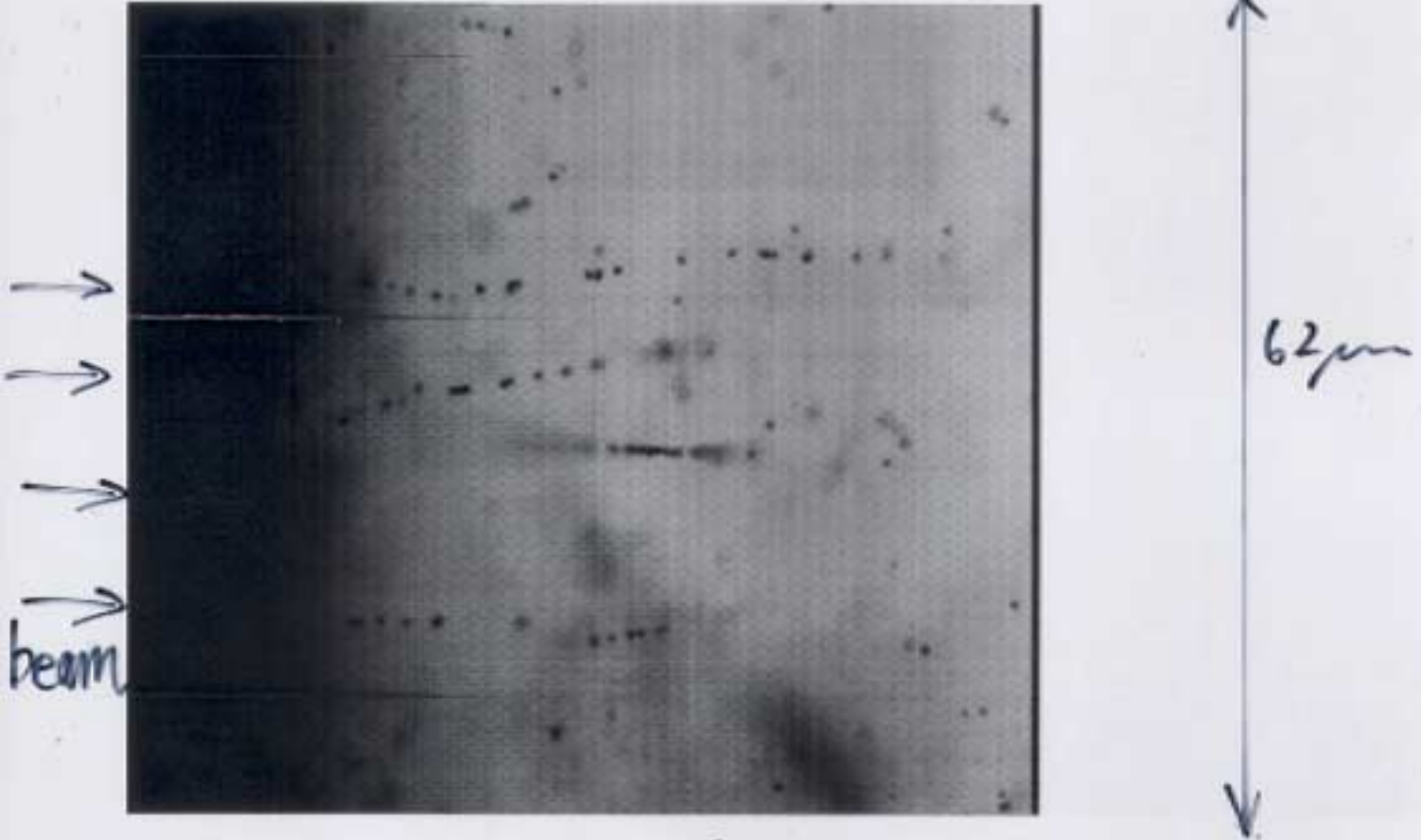
$^{90}\text{Sr}/^{90}\text{Y}$

Emulsion

Horizontal

RIGA SPECTLE





Edge.

1 MeV electron.

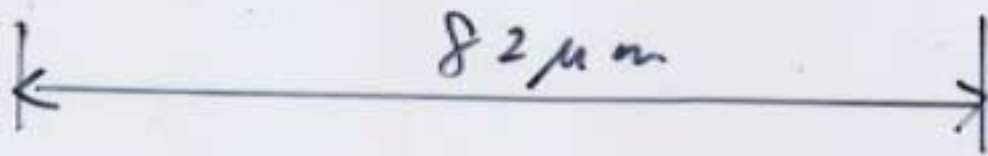
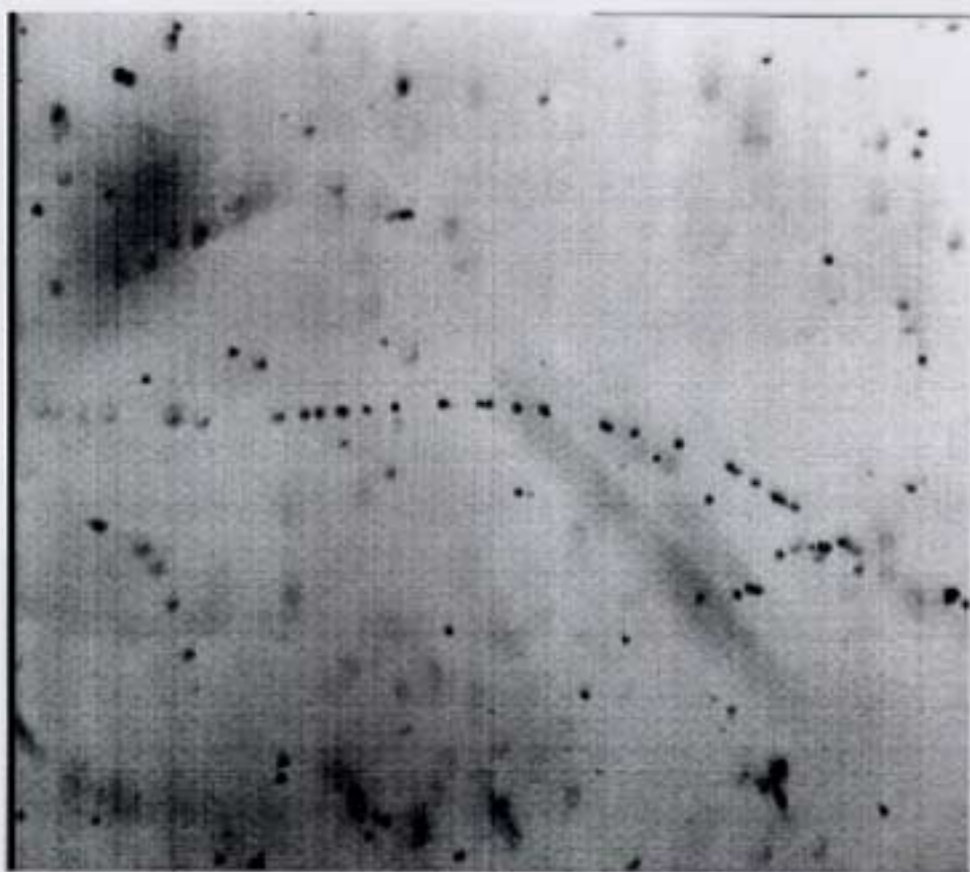


Image of the β .

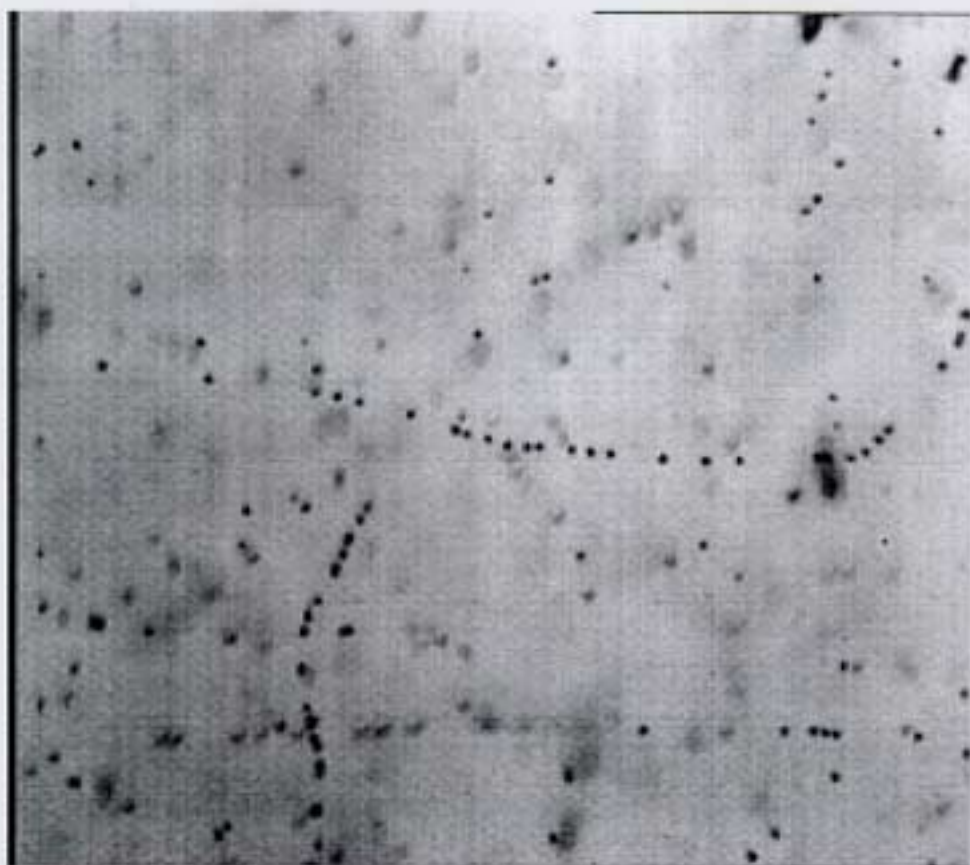
1 MeV

Beam →



← 82 μm →

Samples →

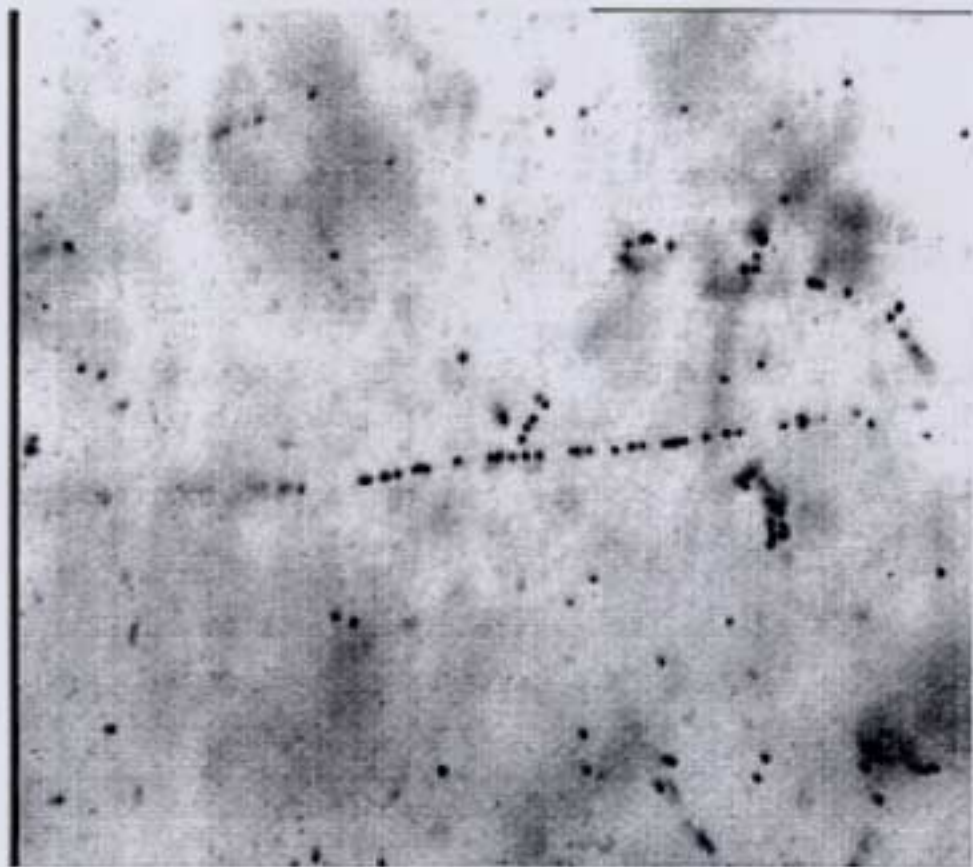


2/16/68

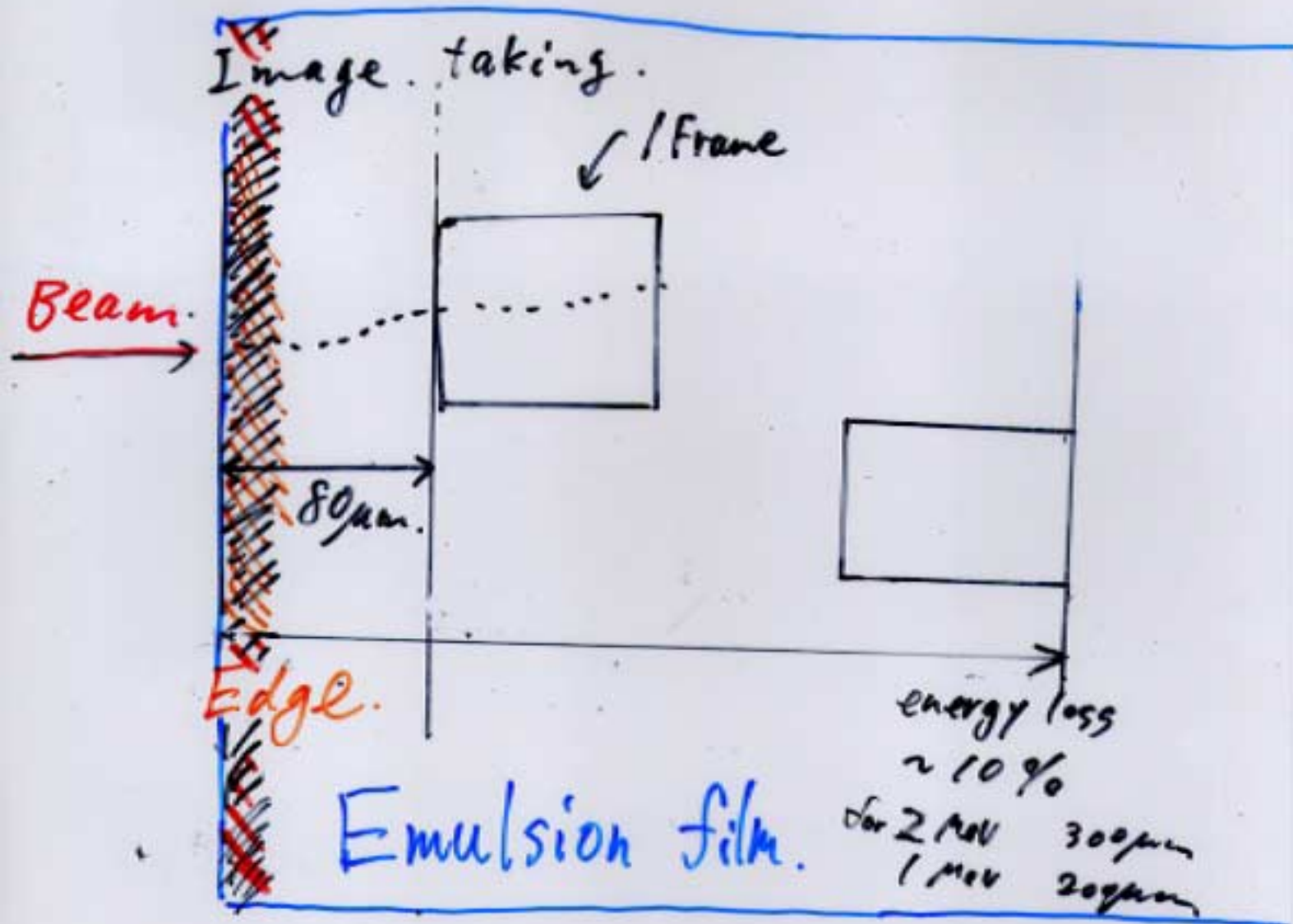
Bean →



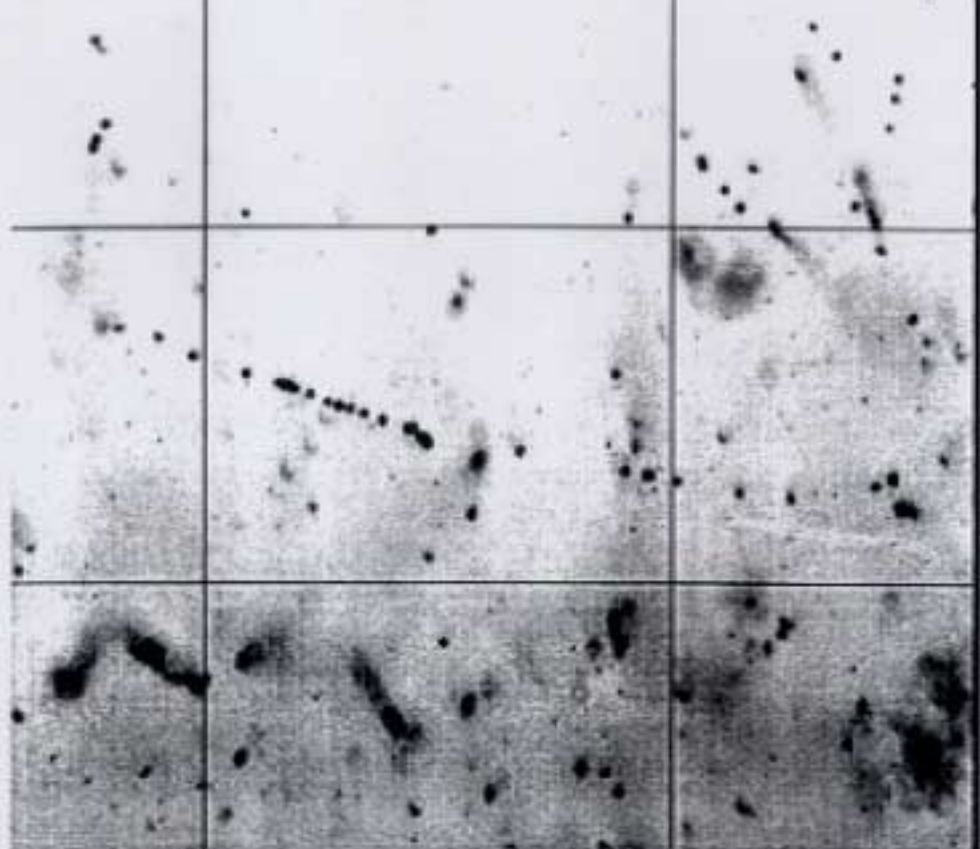
← 82 μm. →



Data taking.



- take only track that is on focus plane.
- 200 frame for each energy.
- Object lens $\times 100$.
Na 1.30.



2 MeV.

0.33 μ m.

←—————→
40 μ m.

Select Grains
and find Center.

Deviation from the Best fit Line.



$$\chi^{RMS} = \sqrt{\langle \Delta \chi_i^2 \rangle}$$

evaluate χ^{RMS} :

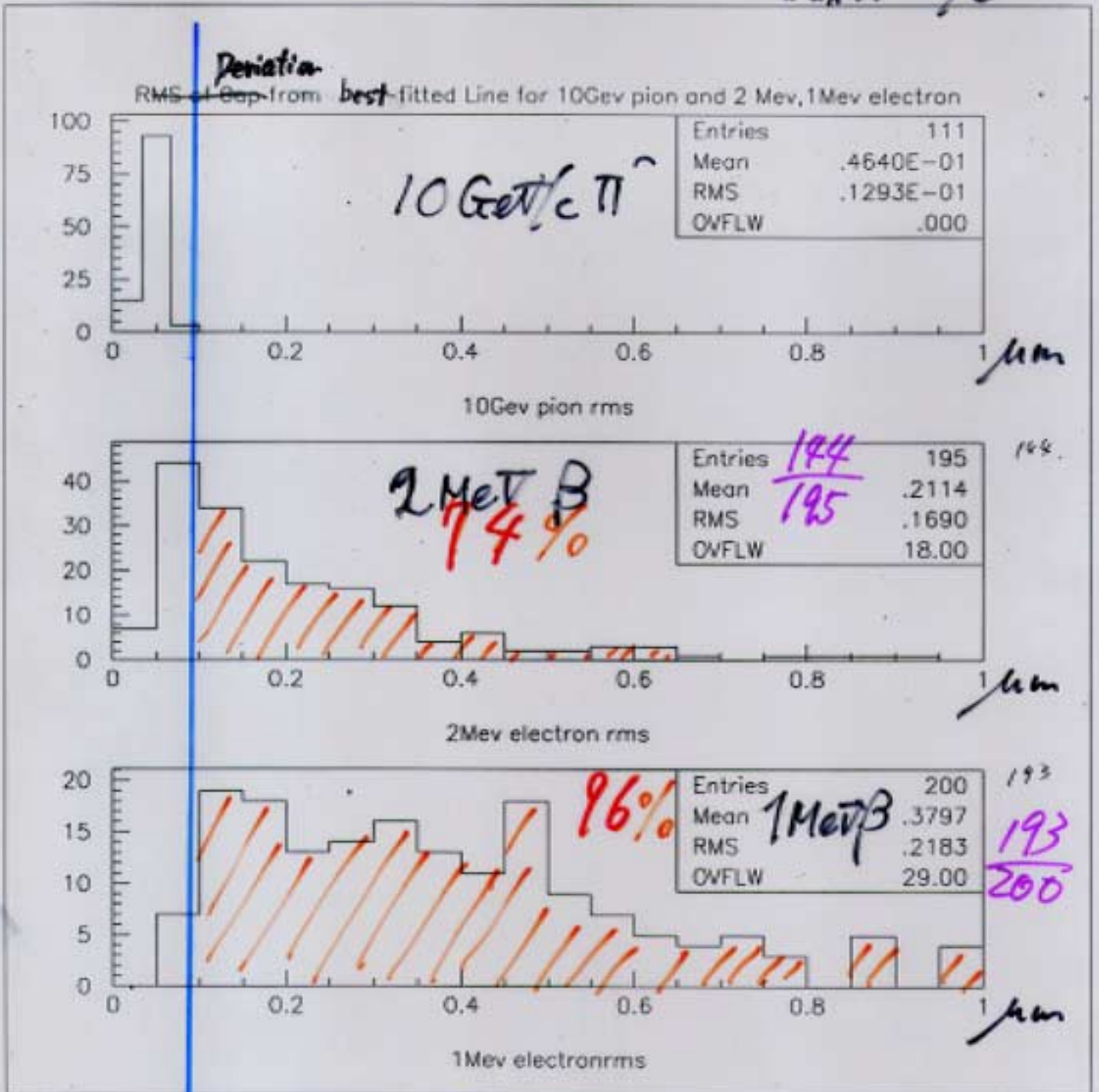
if High energy tracks $\sim 0.05 \mu m$.

At the point of filtering, this is the most simple way to separate.

Calculate χ^{RMS} for each tracks and Compare with non scattered track.

χ^2_{RMS} for each tracks.

χ^2_{axis} χ^2_{RMS} .

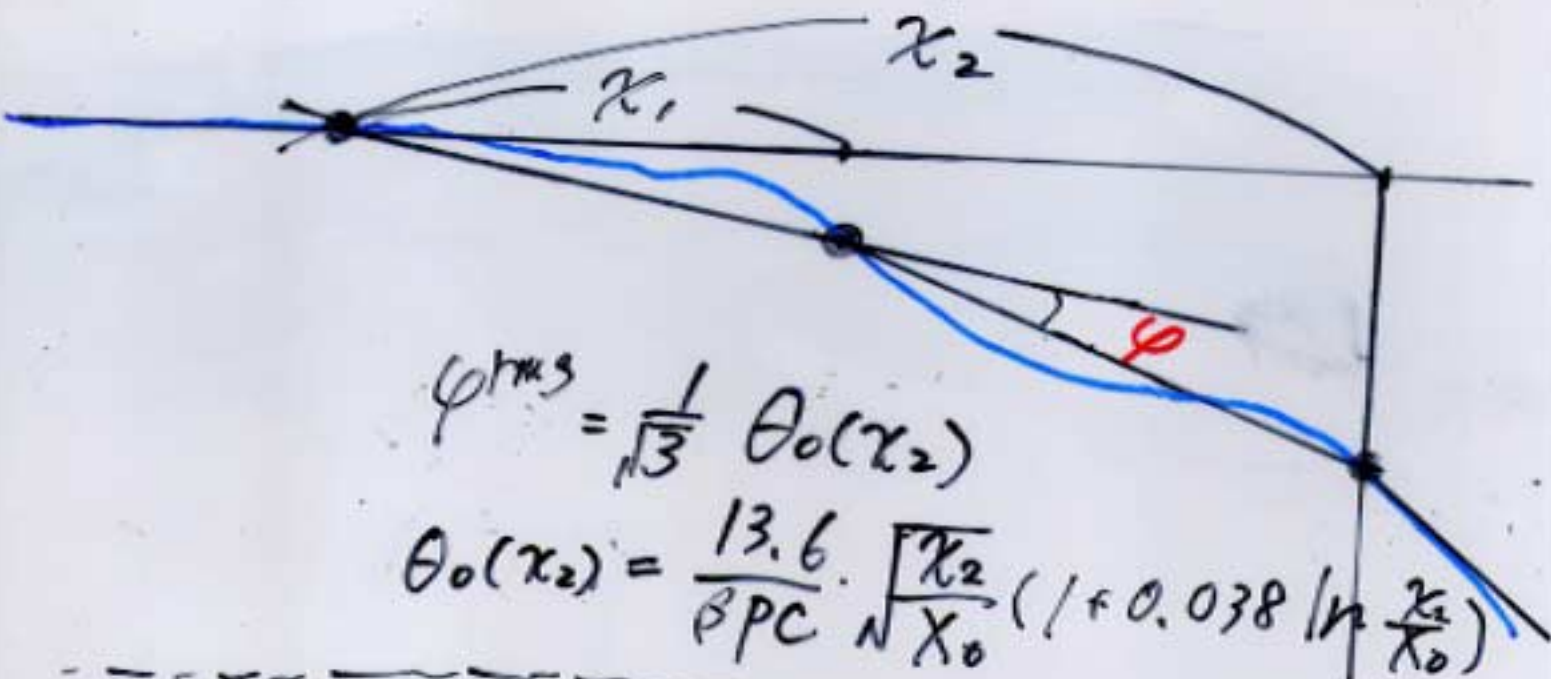


Cut at $\chi^2_{RMS} = 0.1 \mu m$.

No momentum measurement.

Multiple Coulomb Scattering

Grain by Grain.



$$\phi_{rms} = \frac{1}{\sqrt{3}} \theta_0(\chi_2)$$

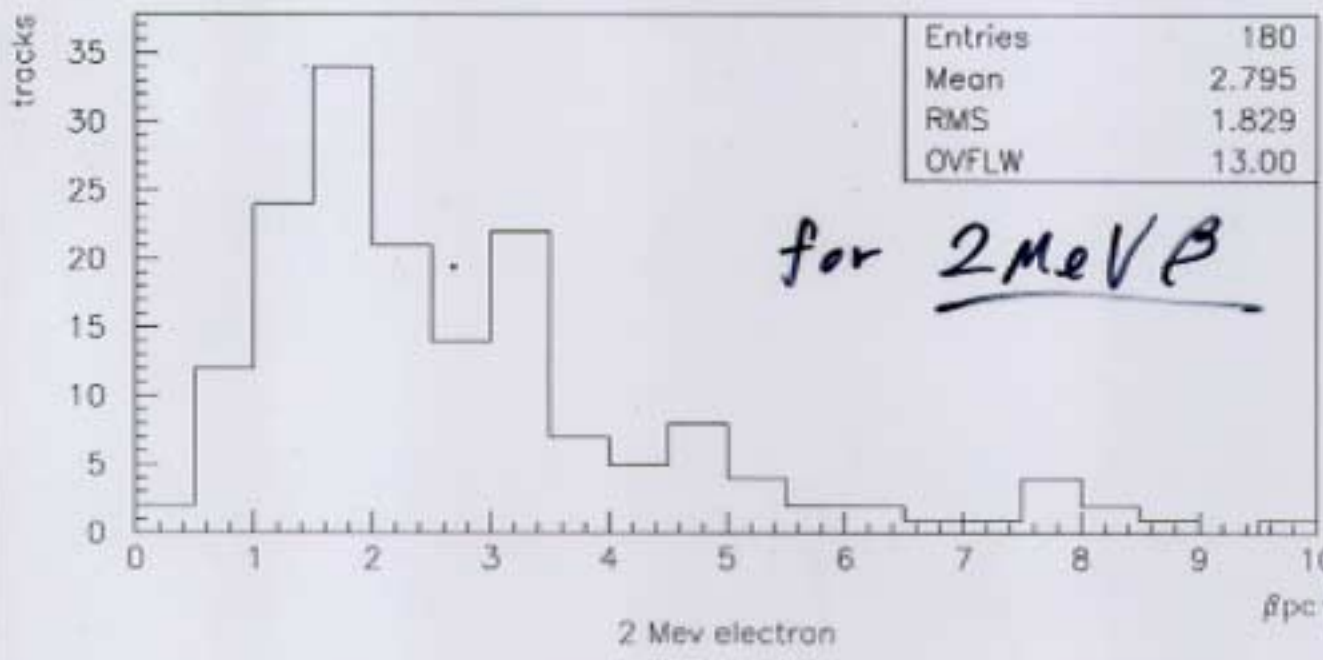
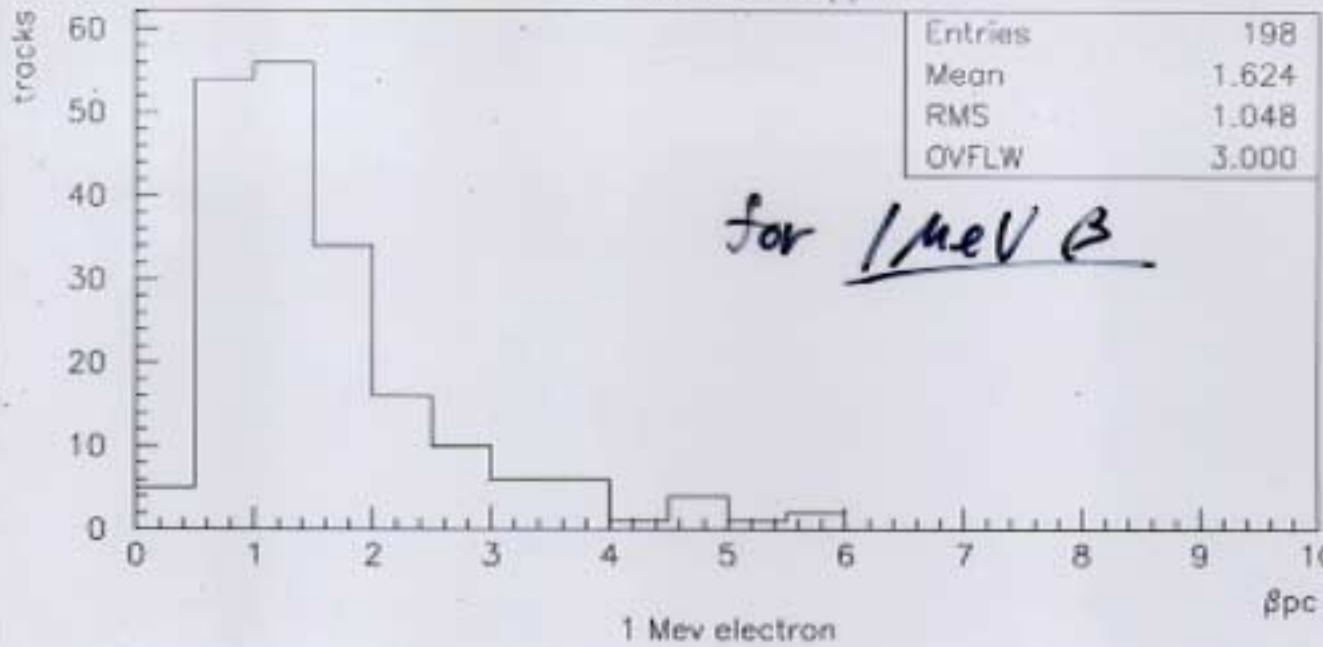
$$\theta_0(\chi_2) = \frac{13.6}{\beta_{PC}} \frac{\sqrt{\chi_2}}{\sqrt{X_0}} \left(1 + 0.038 \ln \frac{\chi_2}{X_0}\right)$$

USE.

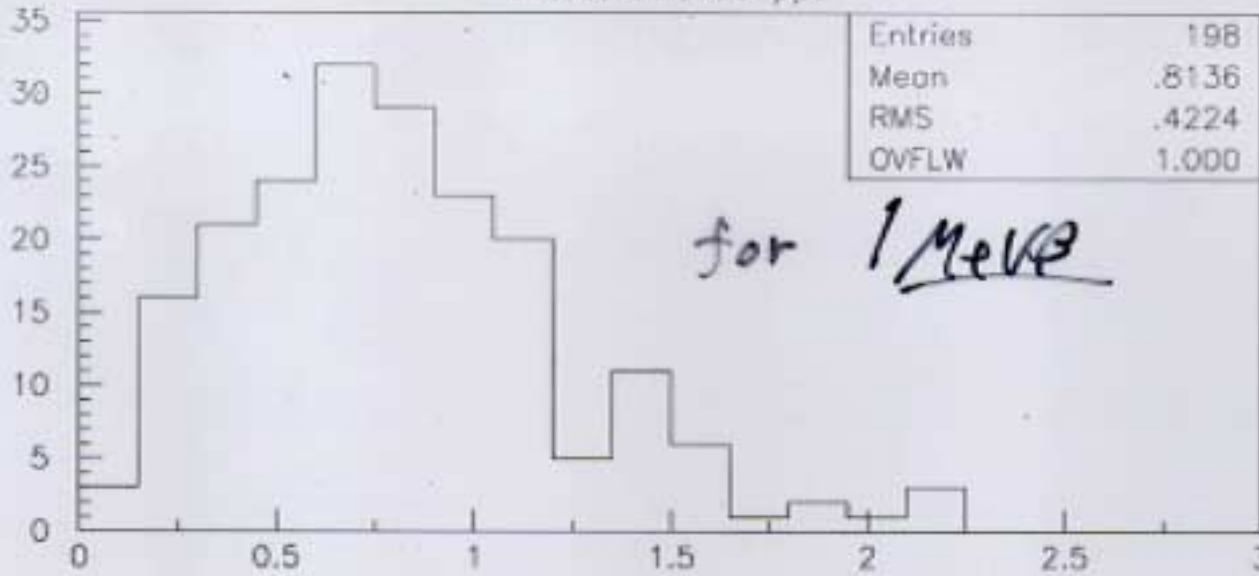
$\chi_1 > 5 \mu\text{m}$ & $\chi_2 - \chi_1 > 5 \mu\text{m}$.

2 ~ 5 sample in one track (40 μm).

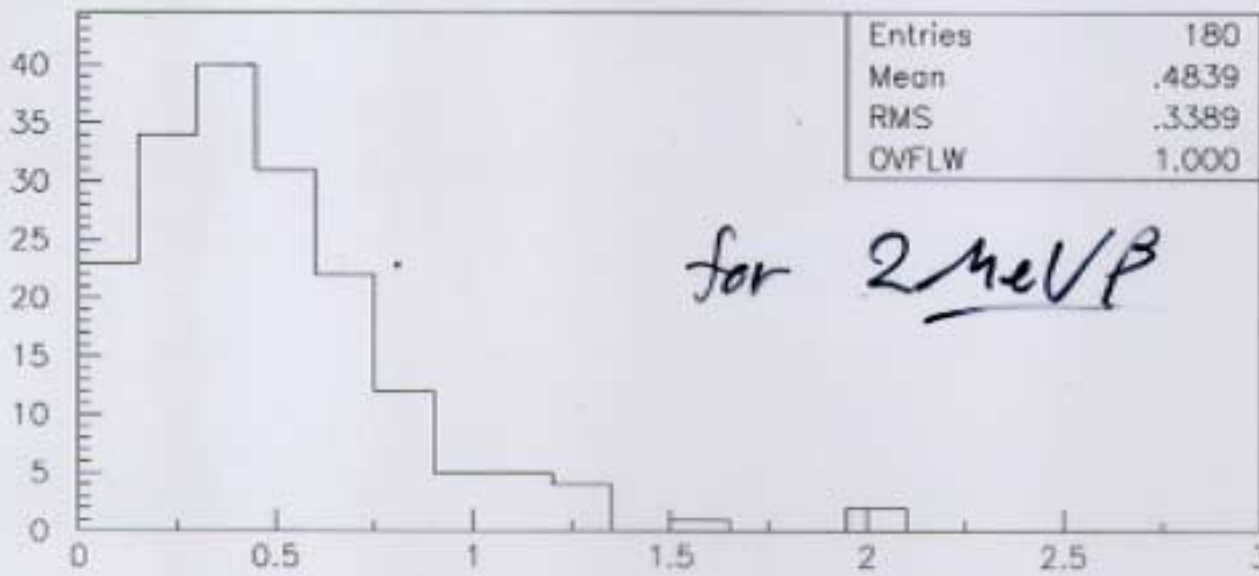
measurement of β_{pc}



measurement of βpc



1 Mev electron



2 Mev electron

Summary.

Scattering of low energy electron
clearly observed.

Outlook.

Next Step is to 3D.
expansion