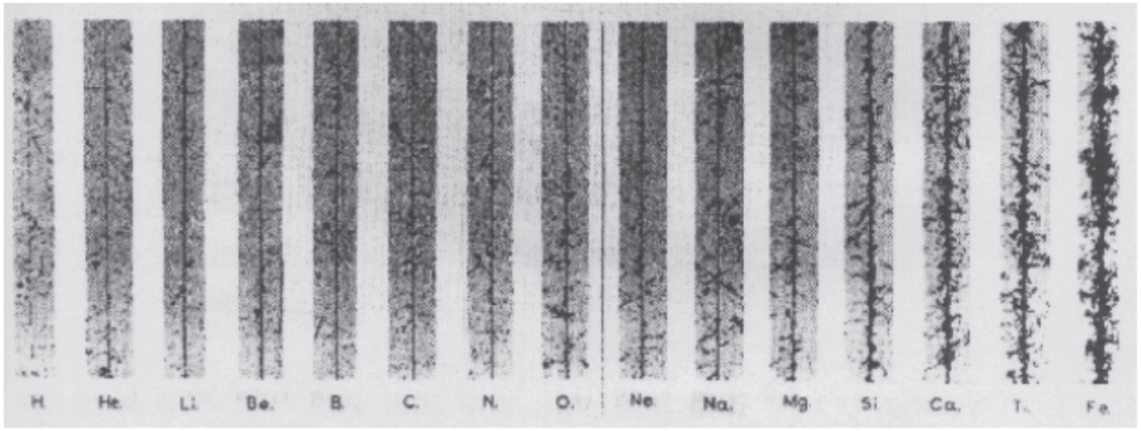
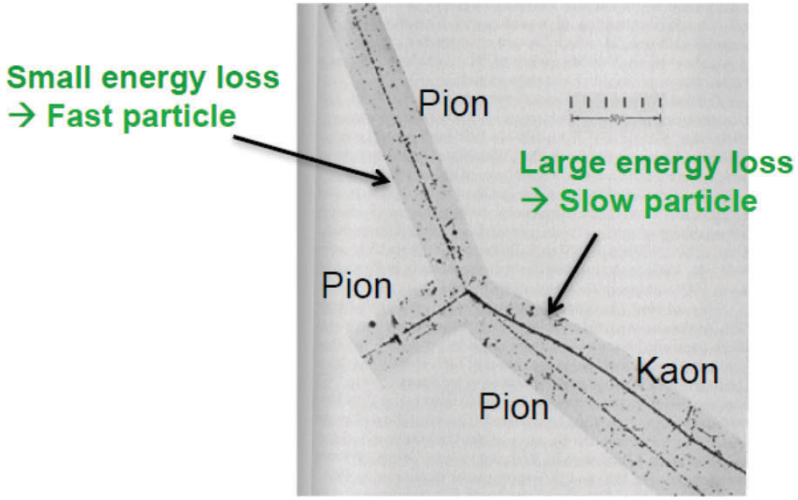

H
He
Li
Be
B
C
N
O
Ne
Na
Mg
Si
Ca
Ti
Fe

emulsioni


Scoperta del π
Lattes, Occhialini
e Powell 1947
μ
e
π


Small energy loss
→ Fast particle
Pion
Large energy loss
→ Slow particle
Pion
Kaon
Pion

Anderson's cloud chamber picture of cosmic radiation from 1932

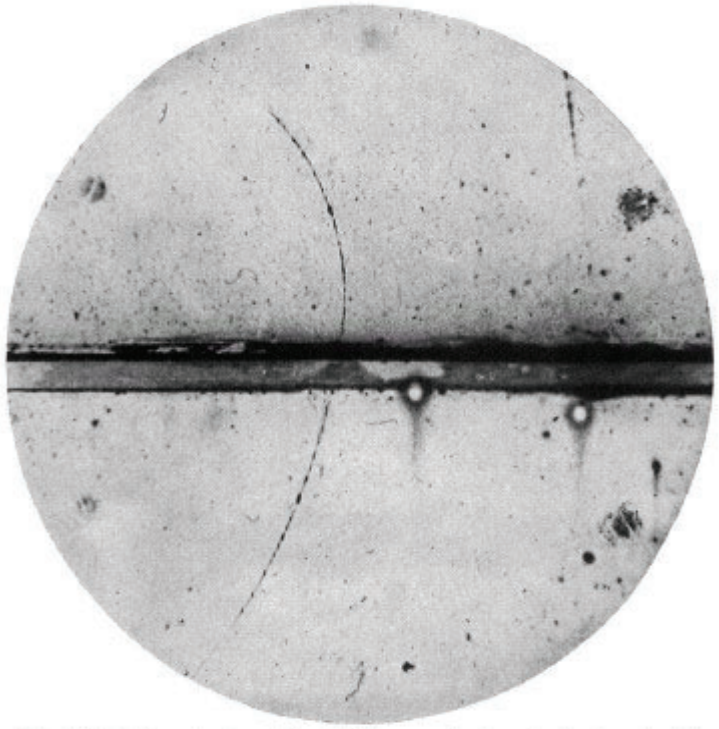


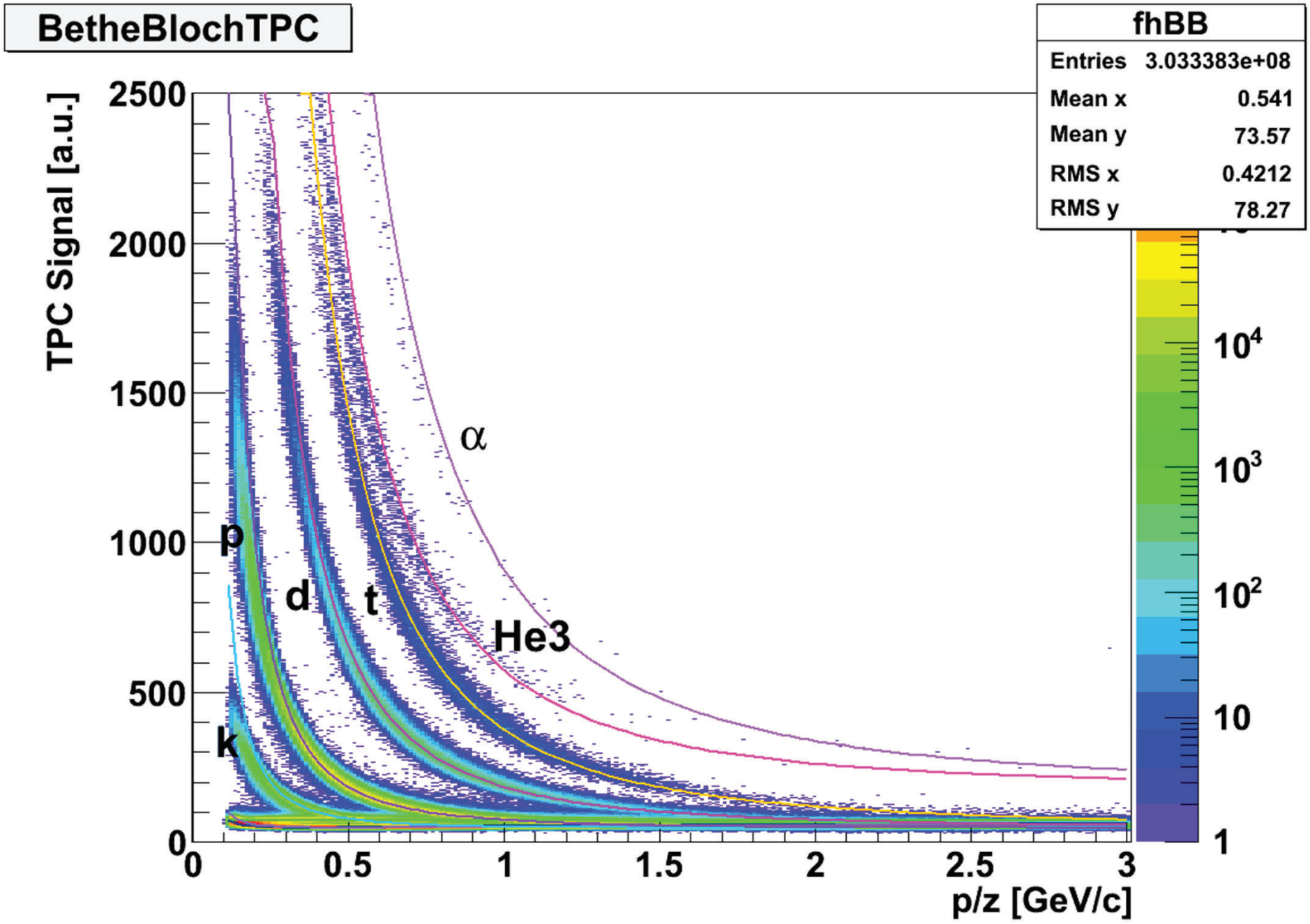
FIG. 1. A 63 million volt positron ($H\rho = 2.1 \times 10^5$ gauss-cm) passing through a 6 mm lead plate and emerging as a 23 million volt positron ($H\rho = 7.5 \times 10^4$ gauss-cm). The length of this latter path is at least ten times greater than the possible length of a proton path of this curvature.

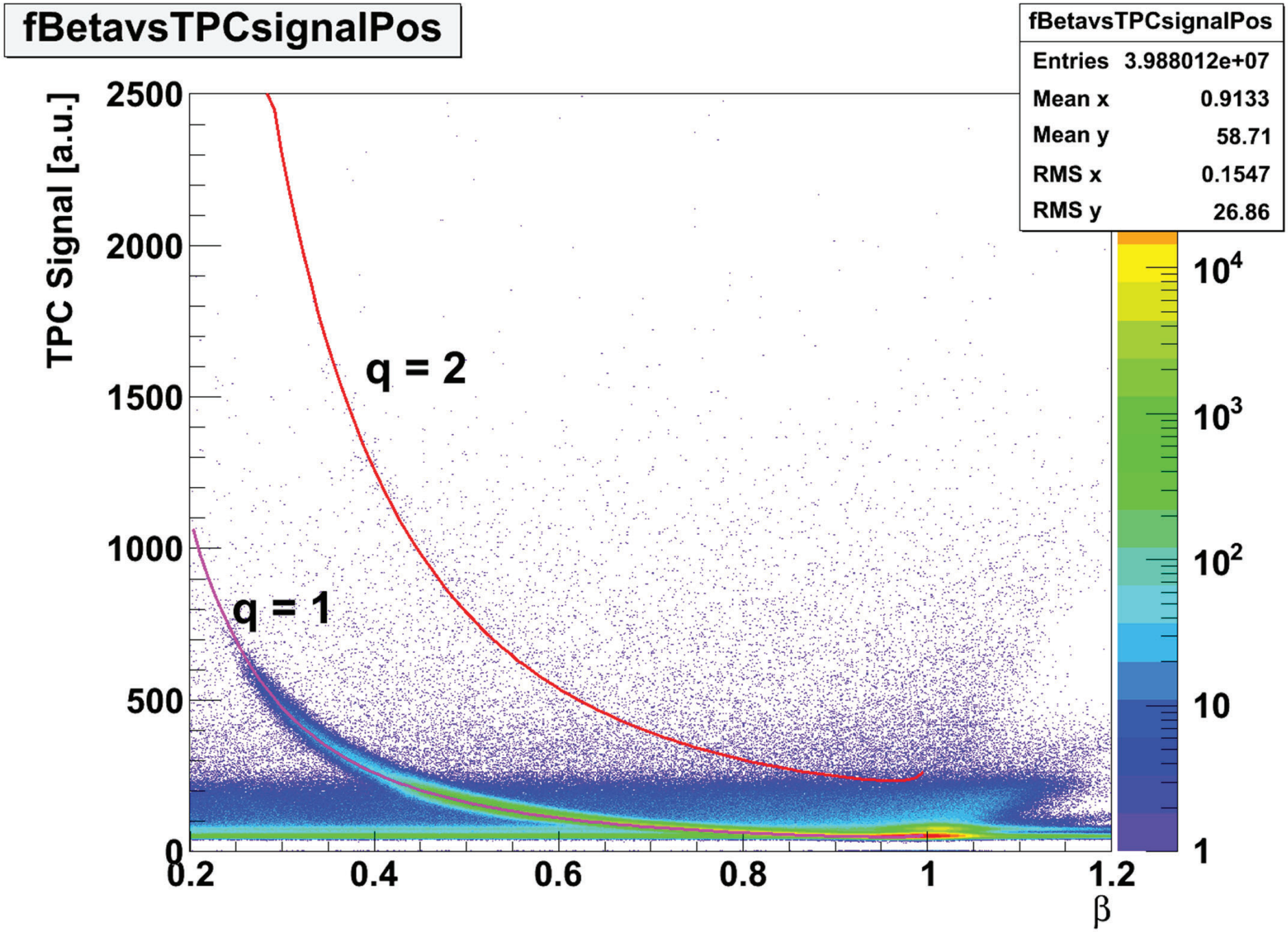
Positron discovery

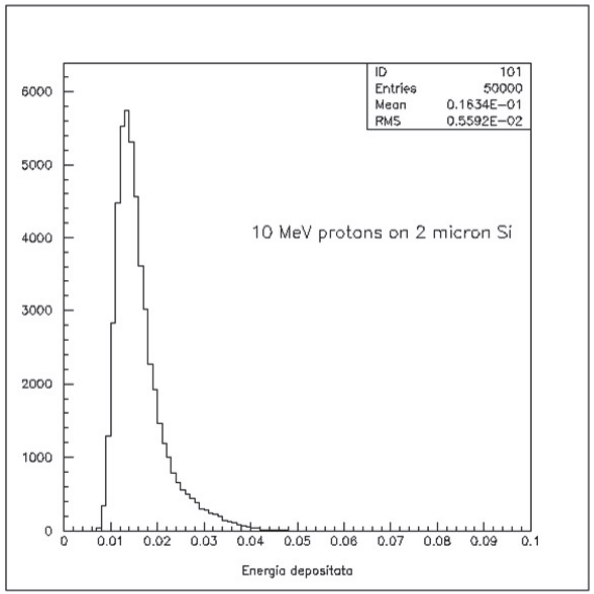
Charge (and momentum) from the curvature in magn. field (and direction with help of absorber…)
Mass from range vs. momentum

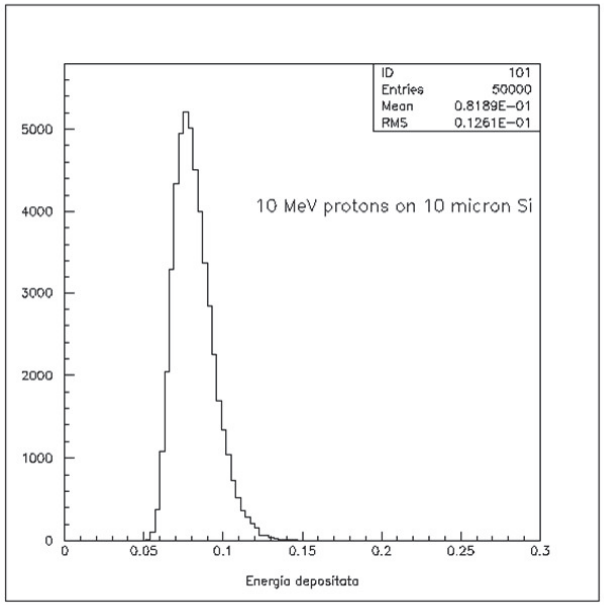
Measured quantities: track, i.e. position measurement (in several points along the trace)

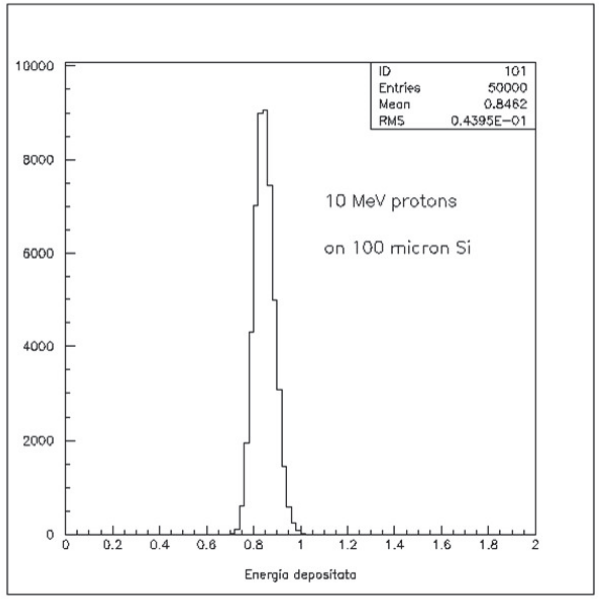
Cloud chamber: sealed environment containing a supersaturated vapor of water or alcohol. When a charged particle interacts with the mixture, it ionizes it. The resulting ions act as condensation nuclei, around which a mist will form .


BetheBlochTPC
fhBB
Entries 3.033383e+08
Mean x 0.541
Mean y 73.57
RMS x 0.4212
RMS y 78.27
TPC Signal [a.u.]
p/z [GeV/c]
p
d
t
He3
α
k
0
500
1000
1500
2000
2500
0.5
1
1.5
2
2.5
3
10^4
10^3
10^2
10
1


fBetavsTPCsignalPos
fBetavsTPCsignalPos
Entries 3.988012e+07
Mean x 0.9133
Mean y 58.71
RMS x 0.1547
RMS y 26.86
TPC Signal [a.u.]
2500
2000
1500
1000
500
0
q = 2
q = 1
0.2
0.4
0.6
0.8
1
1.2
β
10^4
10^3
10^2
10
1


ID 101
Entries 50000
Mean 0.1634E-01
RMS 0.5592E-02
10 MeV protons on 2 micron Si
Energia depositata


ID 101
Entries 50000
Mean 0.8189E-01
RMS 0.1261E-01
10 MeV protons on 10 micron Si
Energia depositata


ID 101
Entries 50000
Mean 0.8462
RMS 0.4395E-01
10 MeV protons
on 100 micron Si
Energia depositata

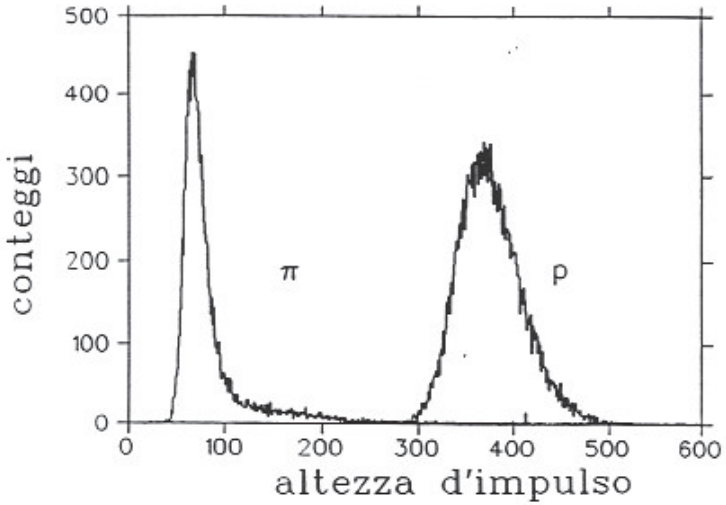


Fig.5.6- Altezza d'impulso di π^+, p in ΔE1 per p=400 MeV/c.

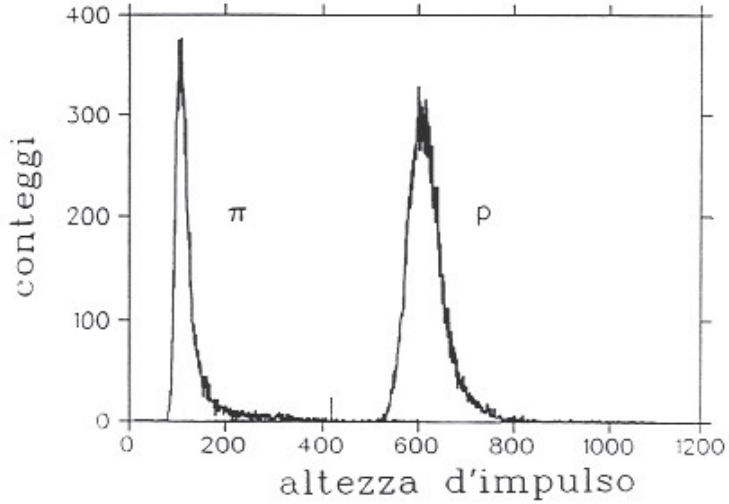
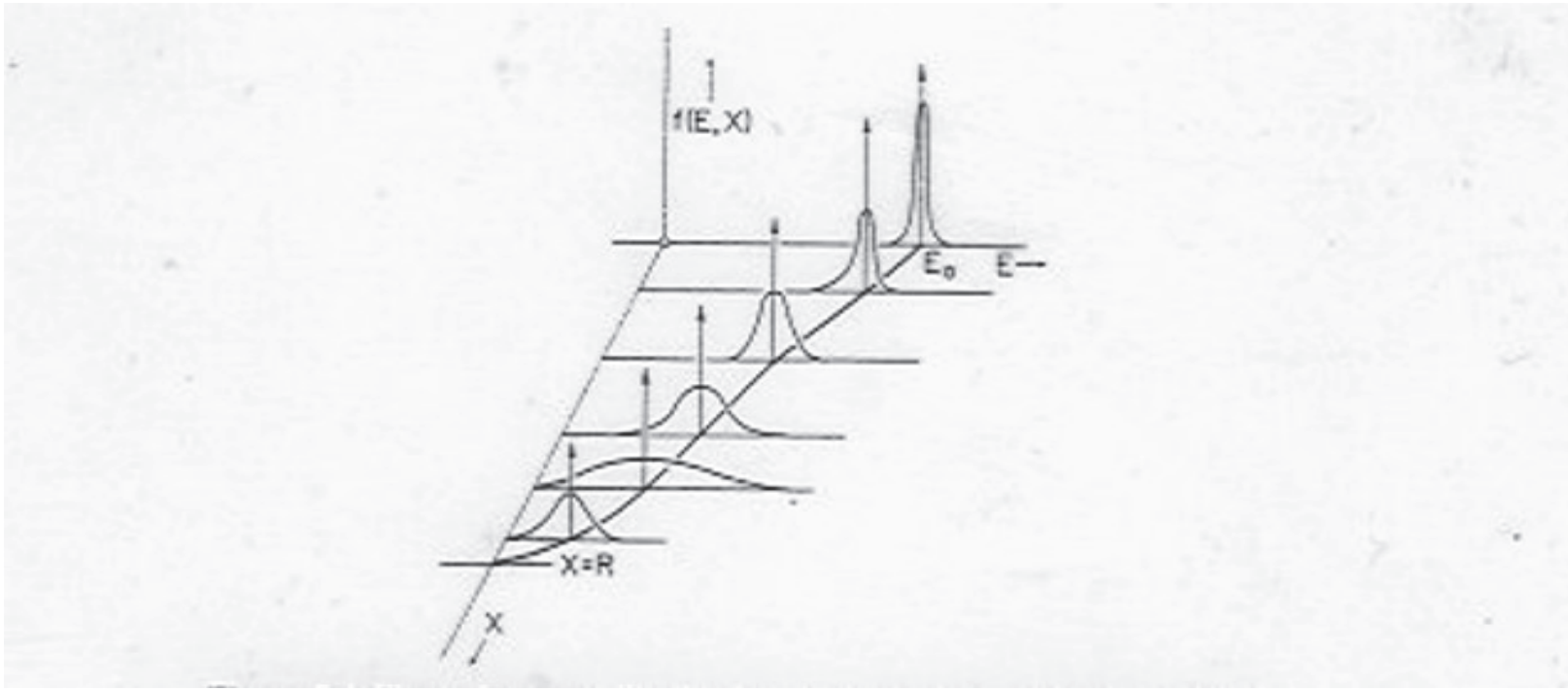
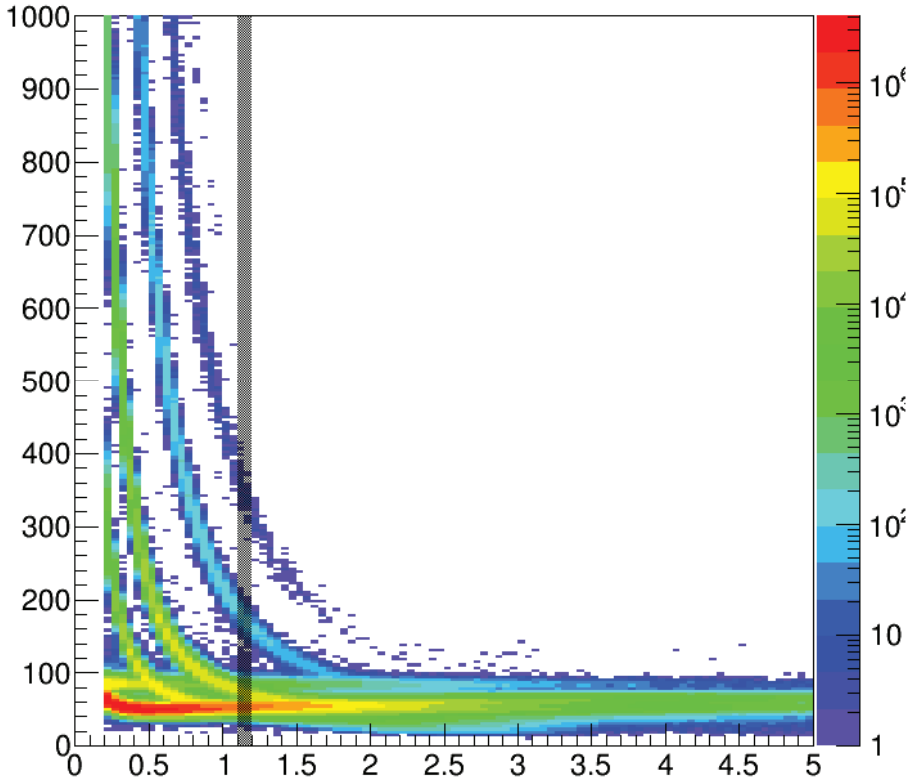
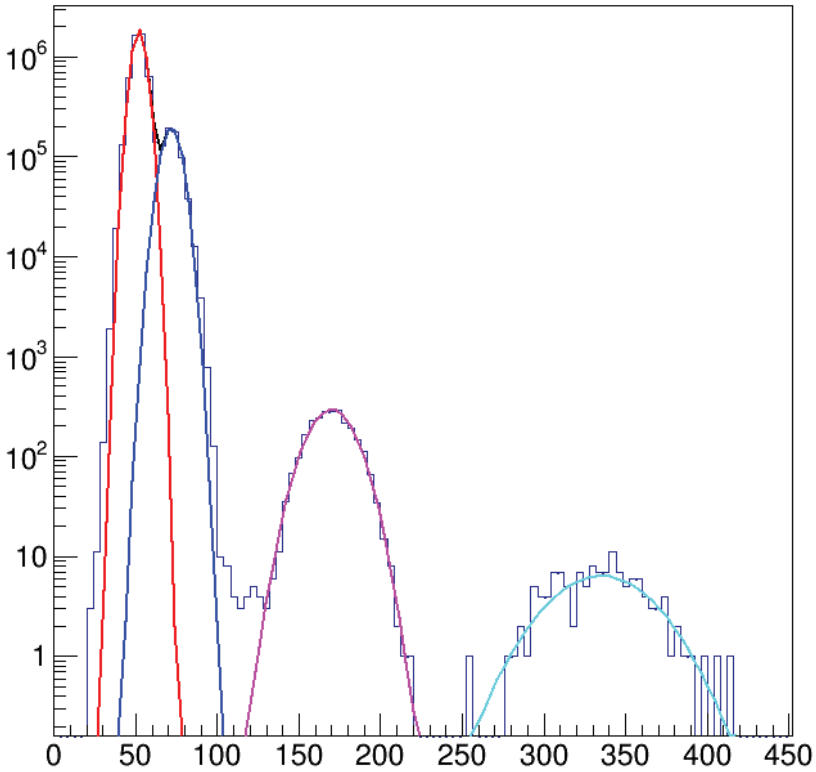


Fig.5.7- Altezza d'impulso di π^+, p in ΔE2 per p=400 MeV/c.

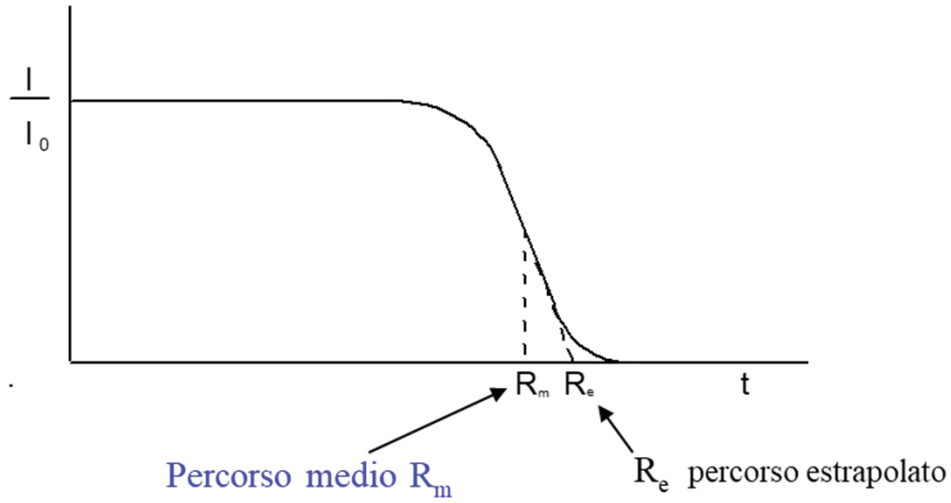

I
I(E,X)
E₀
E
X=R
X

Protons

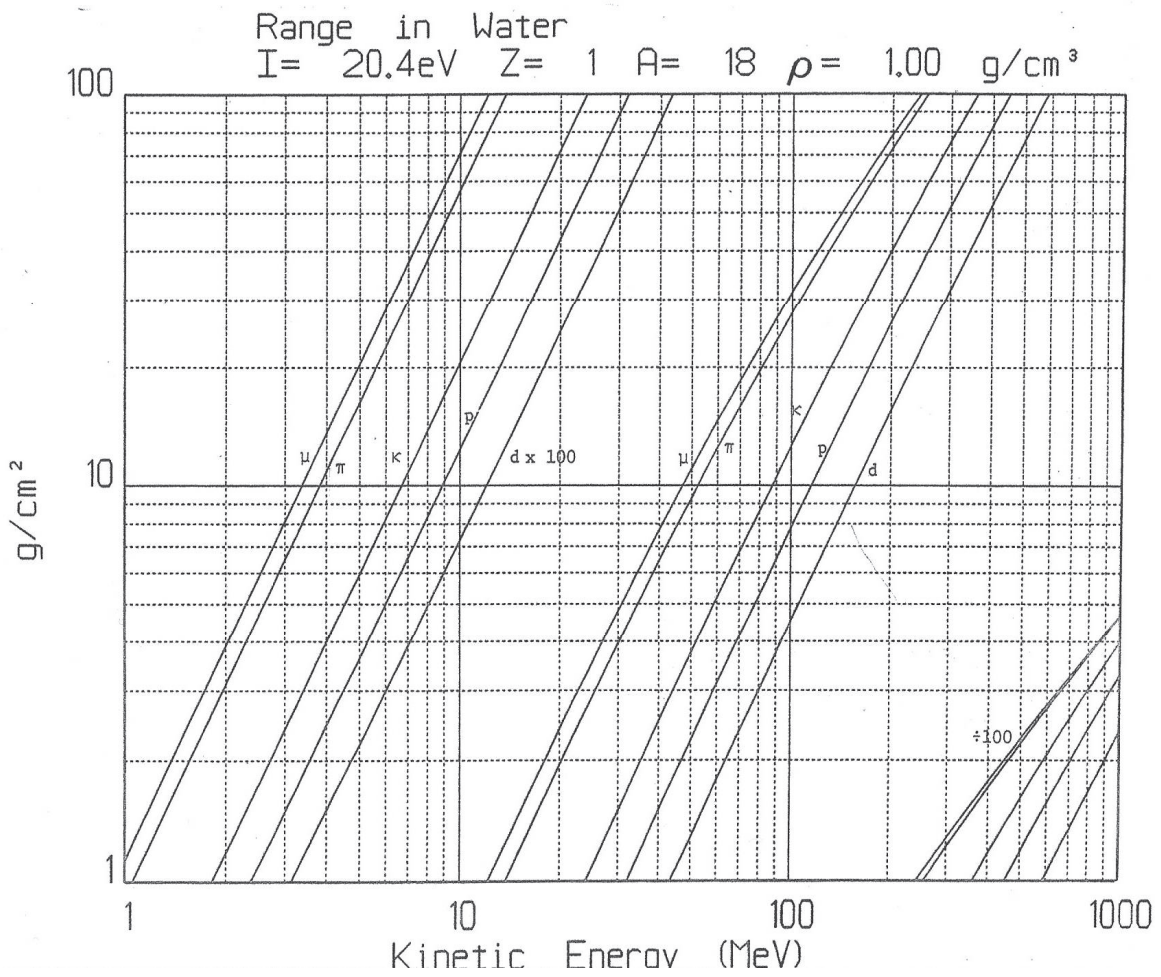


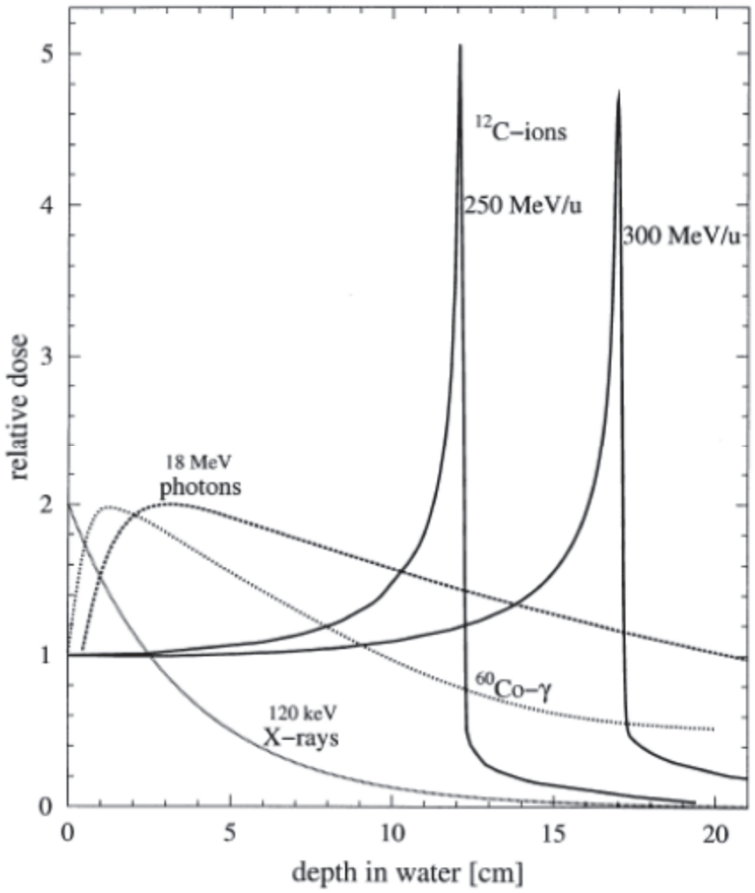


Depth


I
I 0
R m
R e
t
Percorso medio R m
R e percorso estrapolato

Mass discrimination also possible by making RANGE measurements




relative dose
depth in water [cm]
0
1
2
3
4
5
0
5
10
15
20
^{12}C–ions
250 MeV/u
300 MeV/u
18 MeV
photons
^{60}Co–γ
120 keV
X–rays

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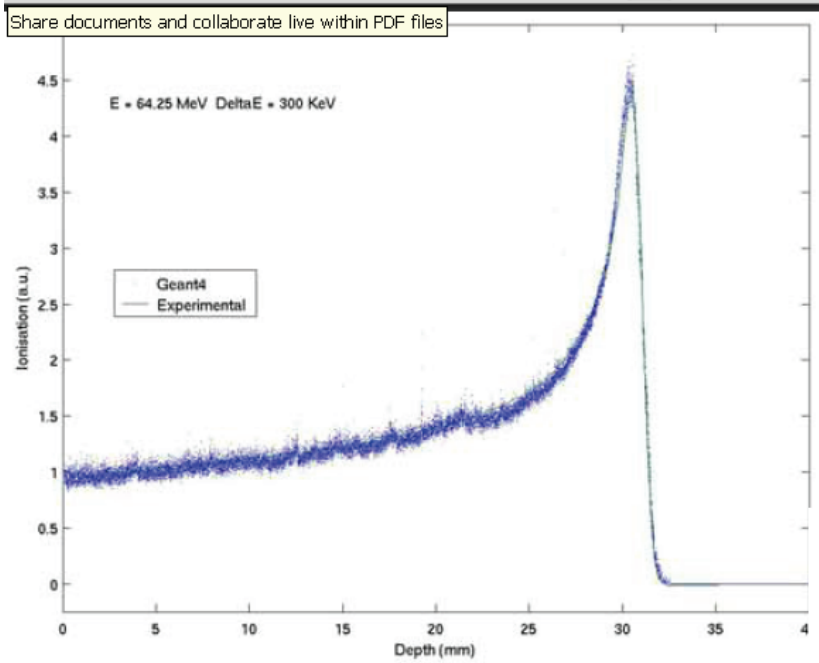
it View Document Tools Window Help

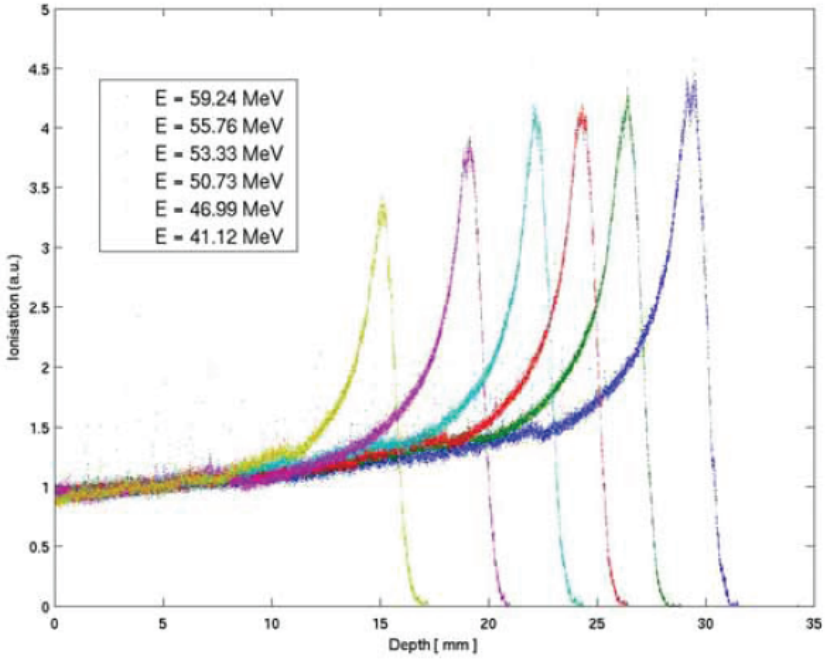
25 / 38 106% Find

Share documents and collaborate live within PDF files



Physic models: comparison vs experimental data

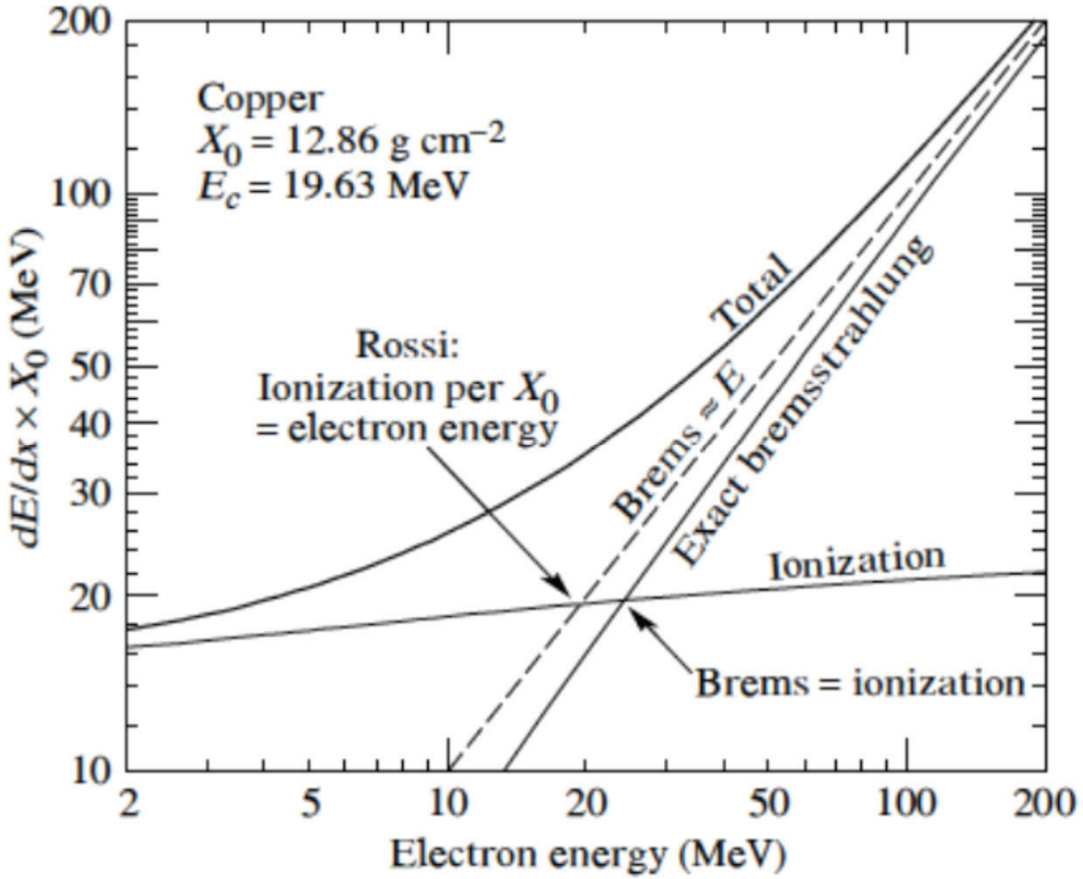
Low energy libraries and hadronic physics



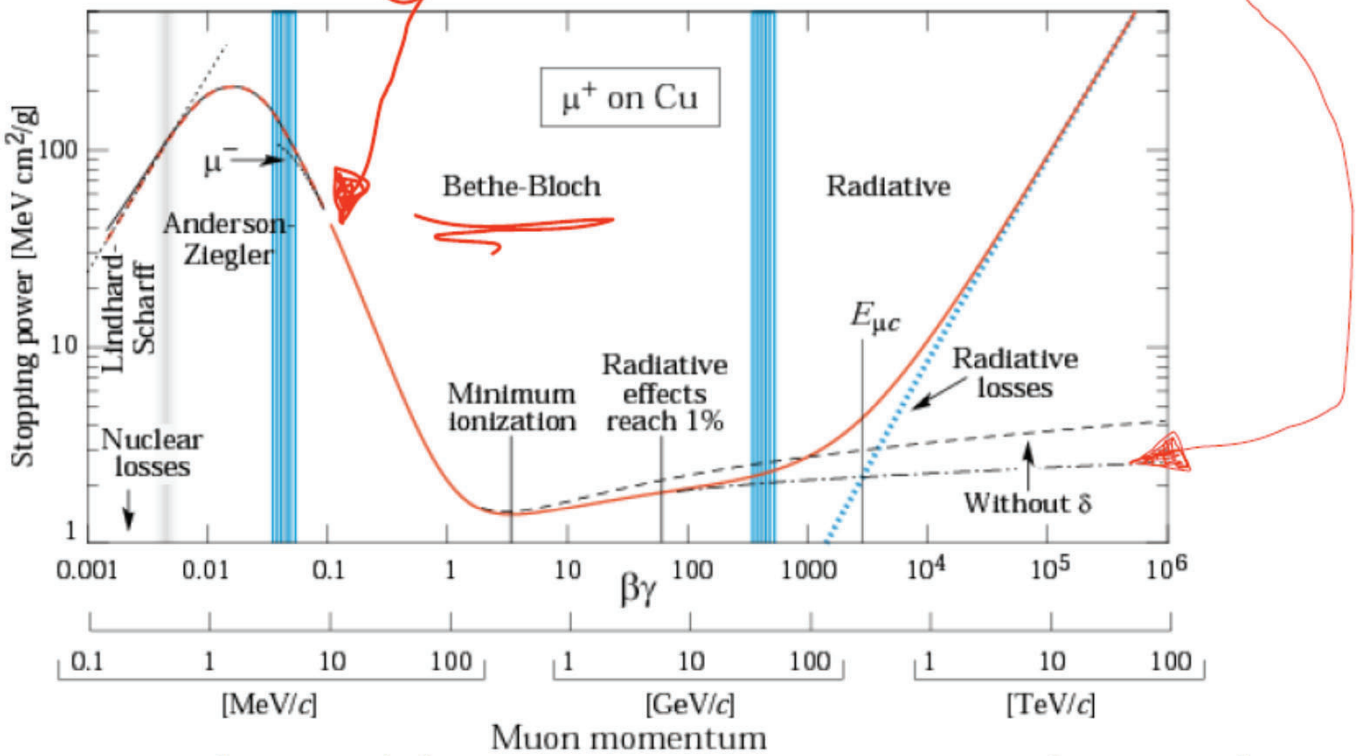
Bragg peaks at diferent energies

G.A.P. Cirrone Phl

RADIAZIONE DI FRENAMENTO



$$\frac{dE}{dx} = Kz^2 \frac{Z}{A}\frac{1}{\beta^2}\left[\frac{1}{2}\ln\frac{2m_e c^2\beta^2\gamma^2 T_{\max}}{I^2} - \beta^2 - \frac{\delta}{2}\right]$$



Stopping power (≡⟨dE/dx⟩) for positive muons in copper as a function of $\beta\gamma = p/Mc$ over nine orders of magnitude in momentum (12 orders of magnitude in kinetic energy). Solid curves indicate the total stopping power.