Remarks about muon detection

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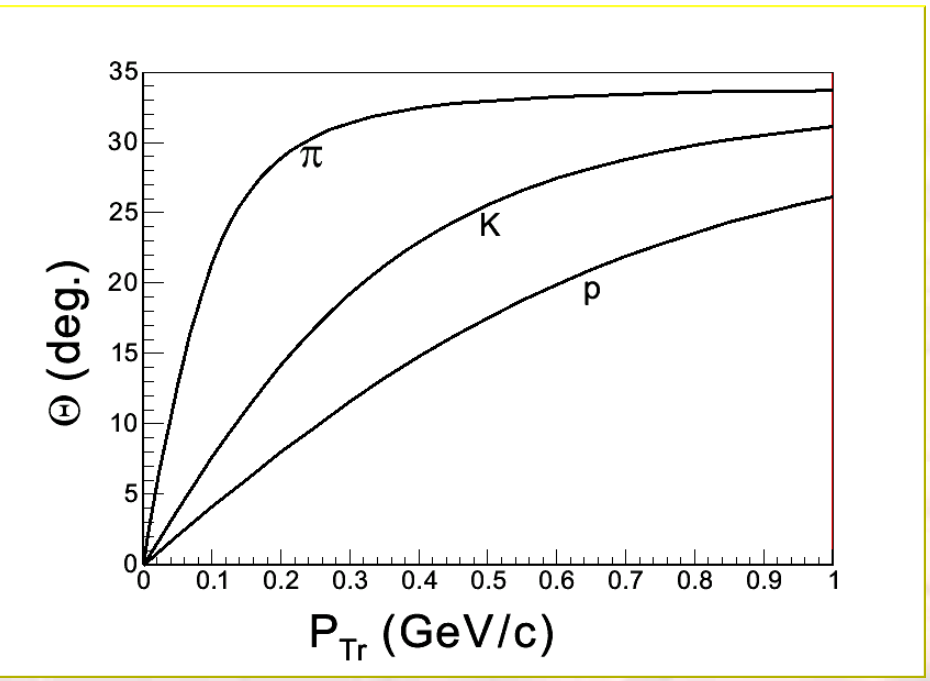
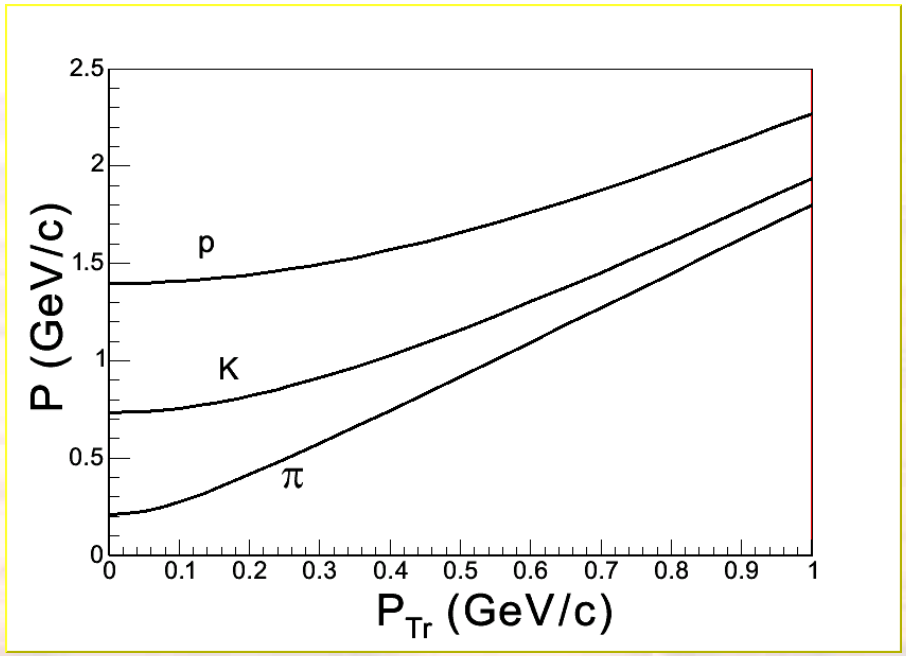
Region have to be studied

$$P_b = 5\ \text{GeV}/(cN); \sqrt{S_{NN}} = 3.37\ \text{GeV}$$





Two kind of muons:

1. Direct N_μ

2. From pion decay $N_\mu(\pi \rightarrow \mu)$

Muon to pion ratio

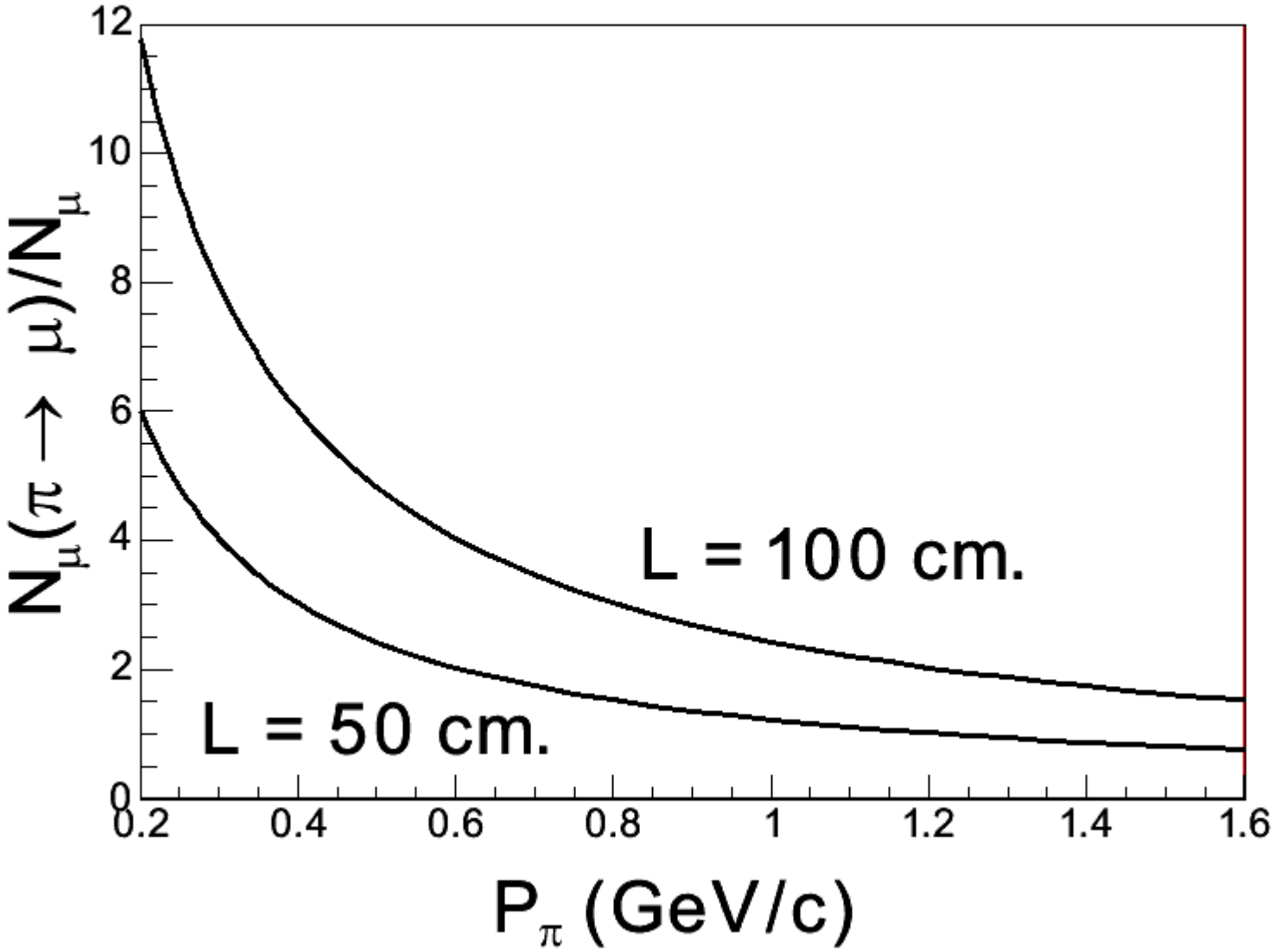
$$N_\mu / N_\pi \approx \alpha = 1/137$$

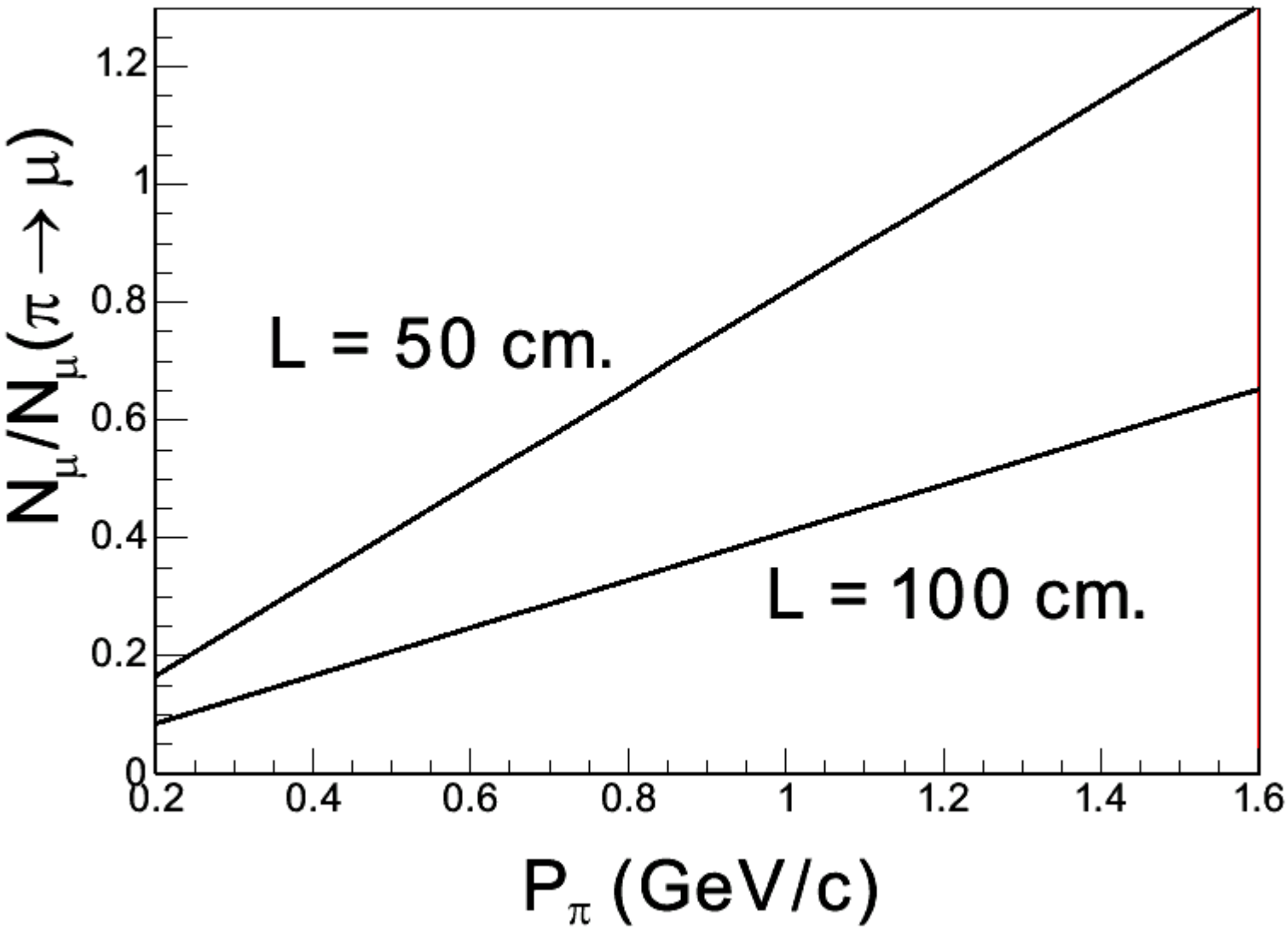
Muon to pion ratio

$$\Gamma(\rho \to \pi\pi) \cdot \alpha^2 \approx \Gamma(\rho \to \mu\mu)$$

$$\Gamma(\rho \to \mu\mu) / \Gamma(\rho \to \pi\pi) = (4.6 \pm 0.28) \cdot 10^{-5};$$

$$\alpha^2 = 5.3 \cdot 10^{-5}$$


12
10
8
6
4
2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
$N_\mu(\pi \rightarrow \mu)/N_\mu$
L = 100 cm.
L = 50 cm.
P_π (GeV/c)


$N_\mu/N_\mu(\pi \rightarrow \mu)$
1.2
1
0.8
0.6
0.4
0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
L = 50 cm.
L = 100 cm.
P_π (GeV/c)

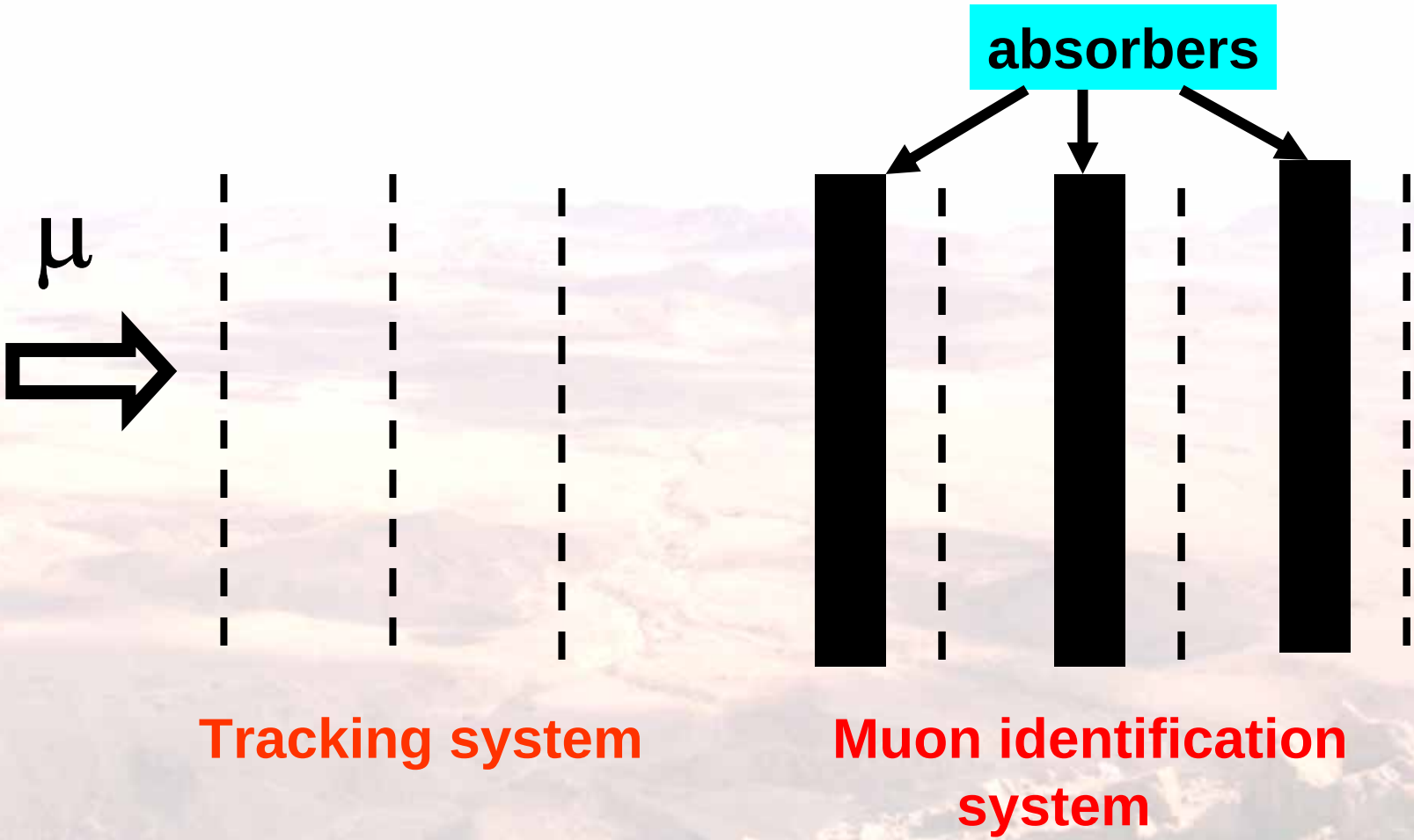
CONLUSION

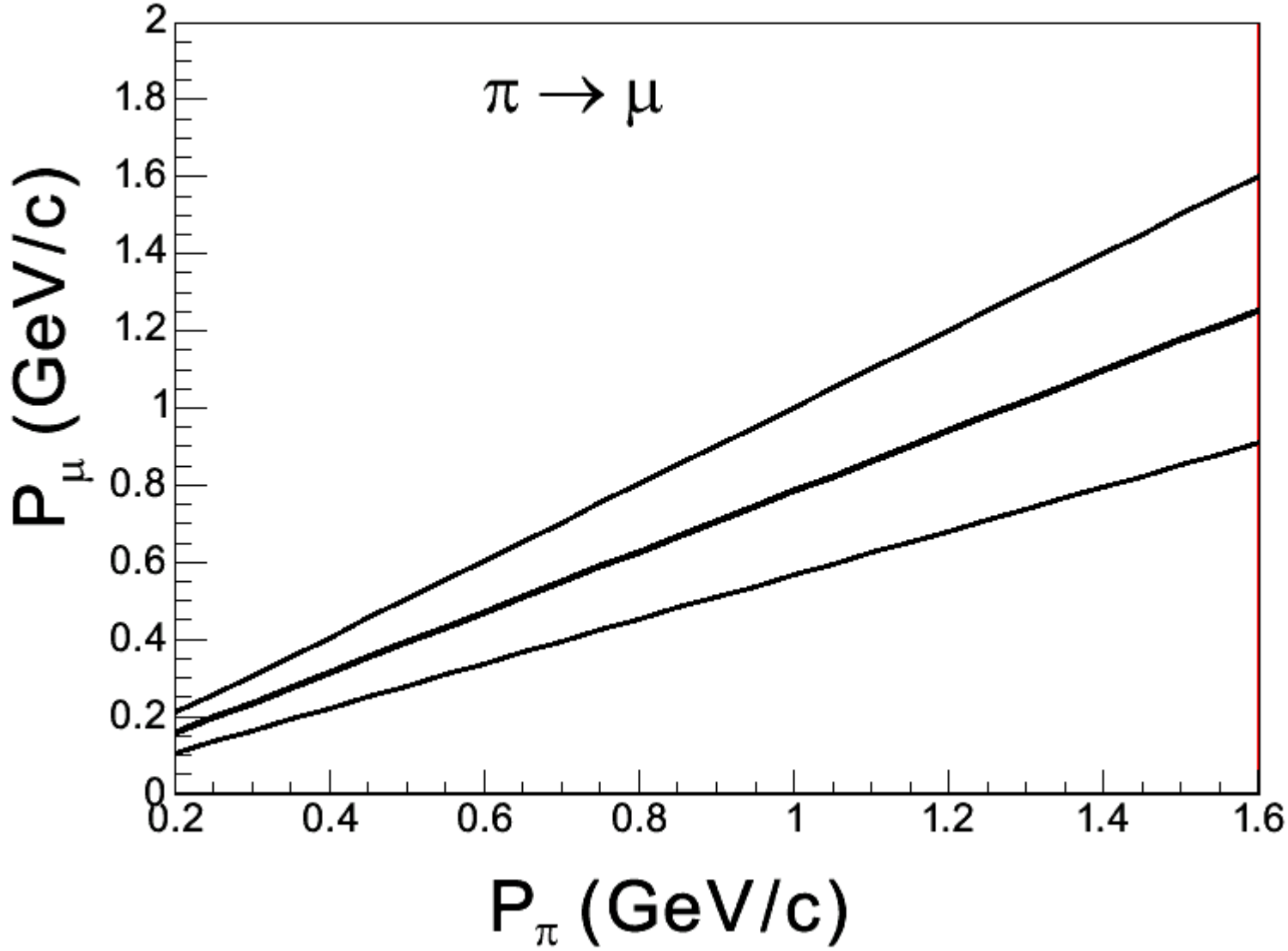
It is extremely difficult task to identify “direct” muons pair in central region.

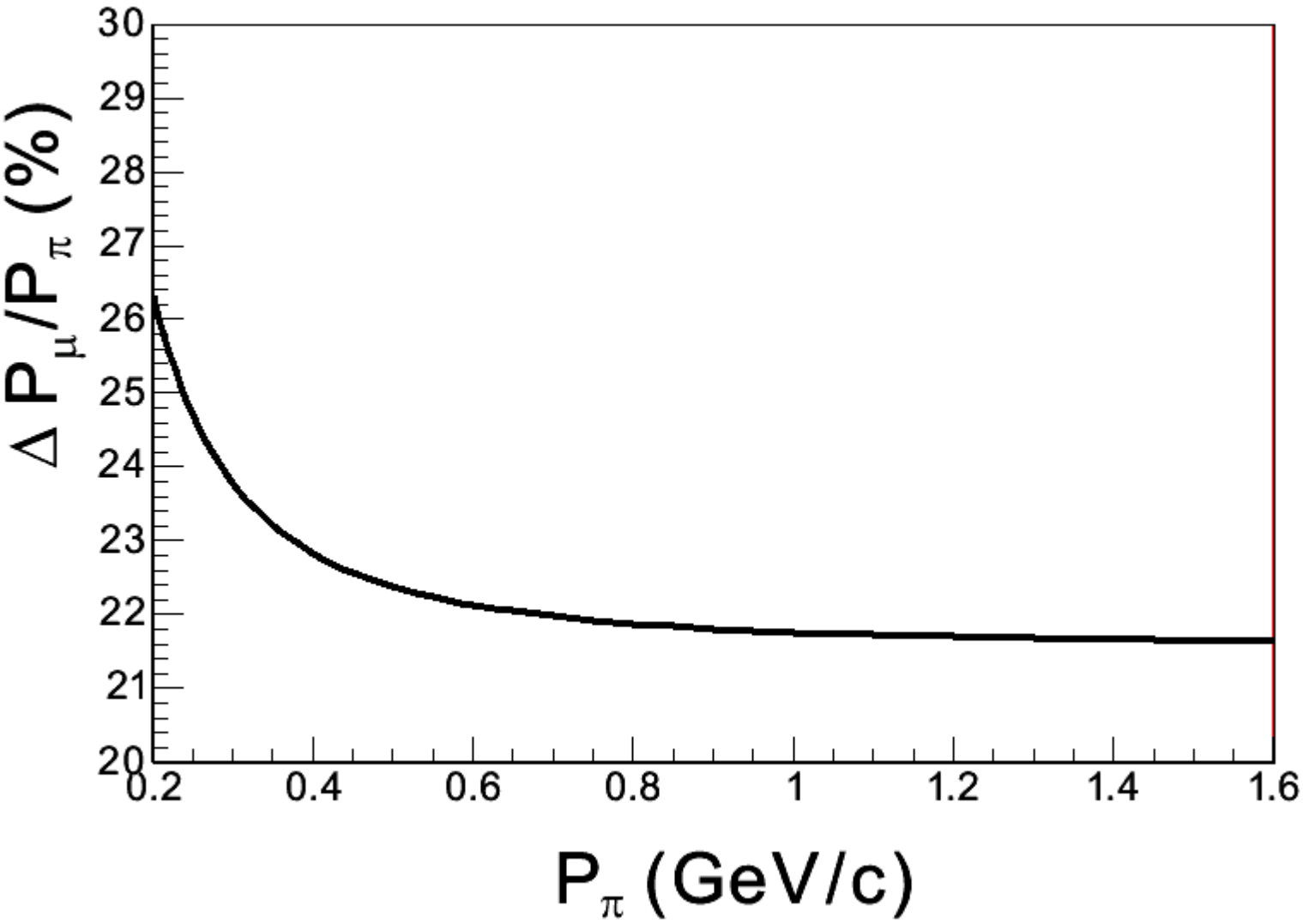
Maybe, impossible?

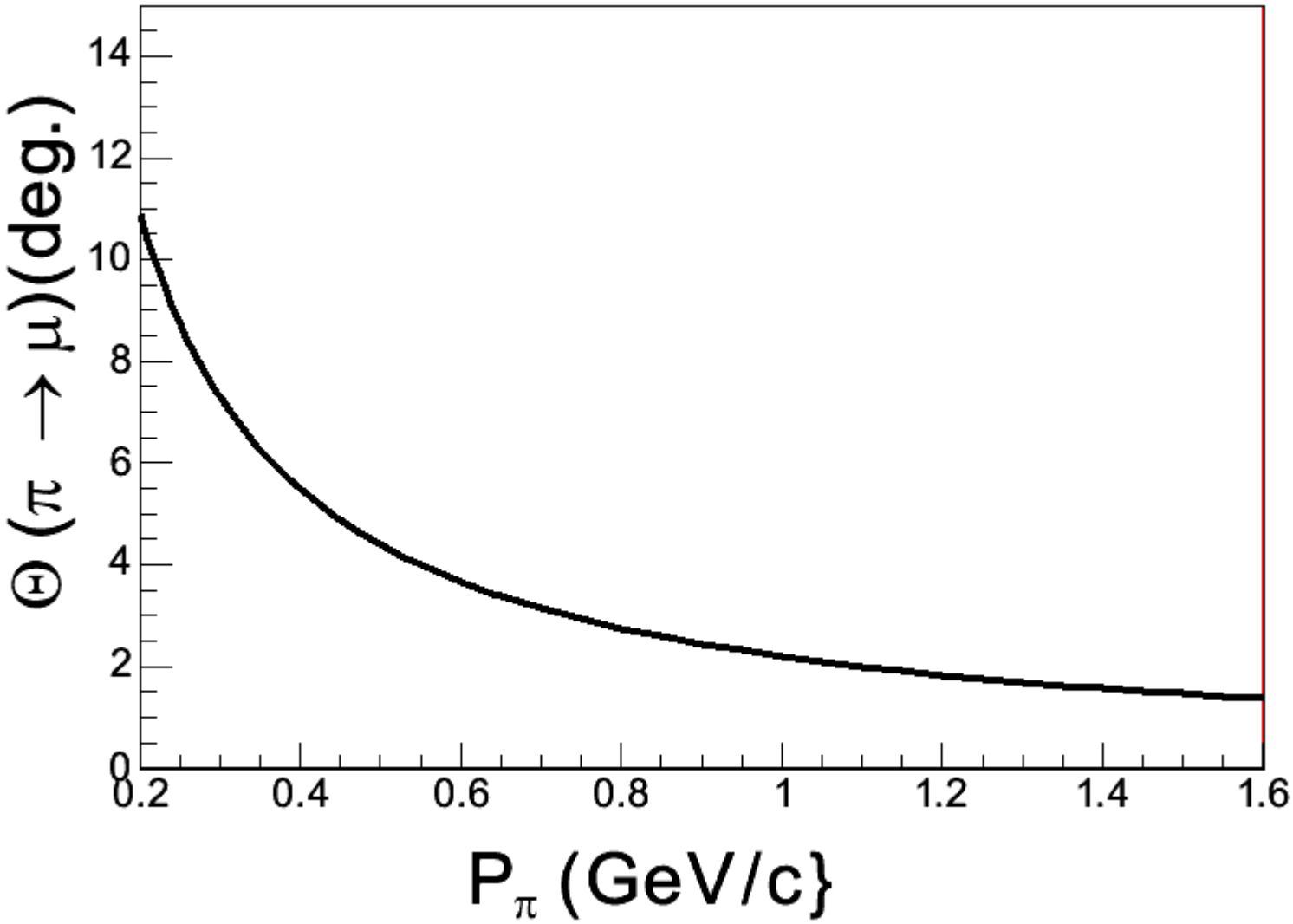
Backup slides

Typical scheme (PHENIX as an example)




π → μ
P_μ (GeV/c)
P_π (GeV/c)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6


30
29
28
27
26
25
24
23
22
21
20
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
Δ P_μ/P_π (%)
P_π (GeV/c)

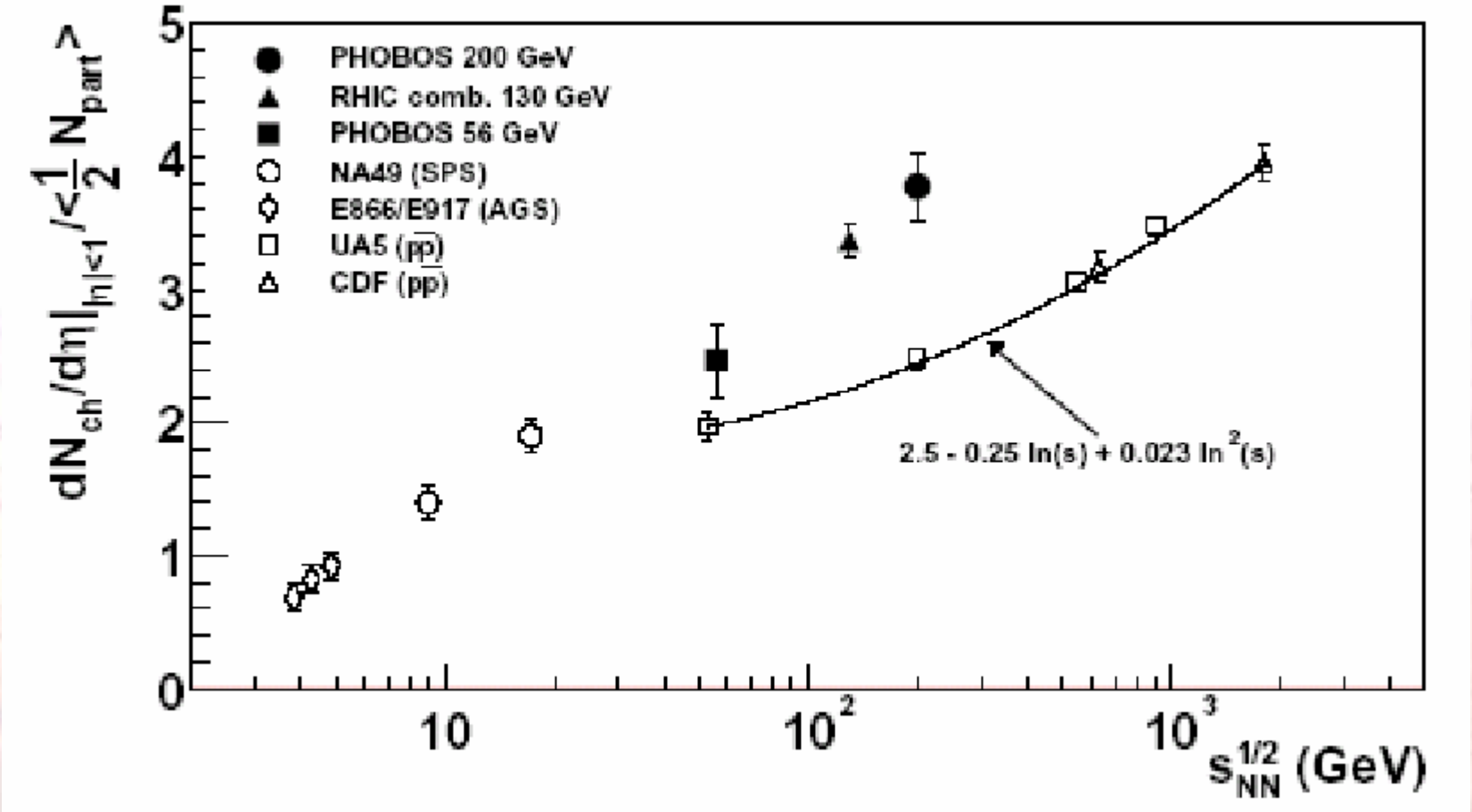

Θ (π → μ)(deg.)
14
12
10
8
6
4
2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
P_π (GeV/c}

The questions:

1. If there is some equation for energy density?

What instead Bjorken? $\epsilon_{Bj} = \frac{dE_T}{dy}\frac{1}{\tau_0 \pi R^2}$

2. Impact parameters for different colliding nuclei. How can we measure it?


PHOBOS 200 GeV
RHIC comb. 130 GeV
PHOBOS 56 GeV
NA49 (SPS)
E866/E917 (AGS)
UA5 (p̄p)
CDF (p̄p)
2.5 - 0.25 ln(s) + 0.023 ln²(s)
dN_ch/dη|_|η|<1 / <½ N_part>
s_NN^1/2 (GeV)
0
1
2
3
4
5
10
10²
10³