THE UNIVERSITY OF WARWICK

First look at π,μ yields vs atomic Z

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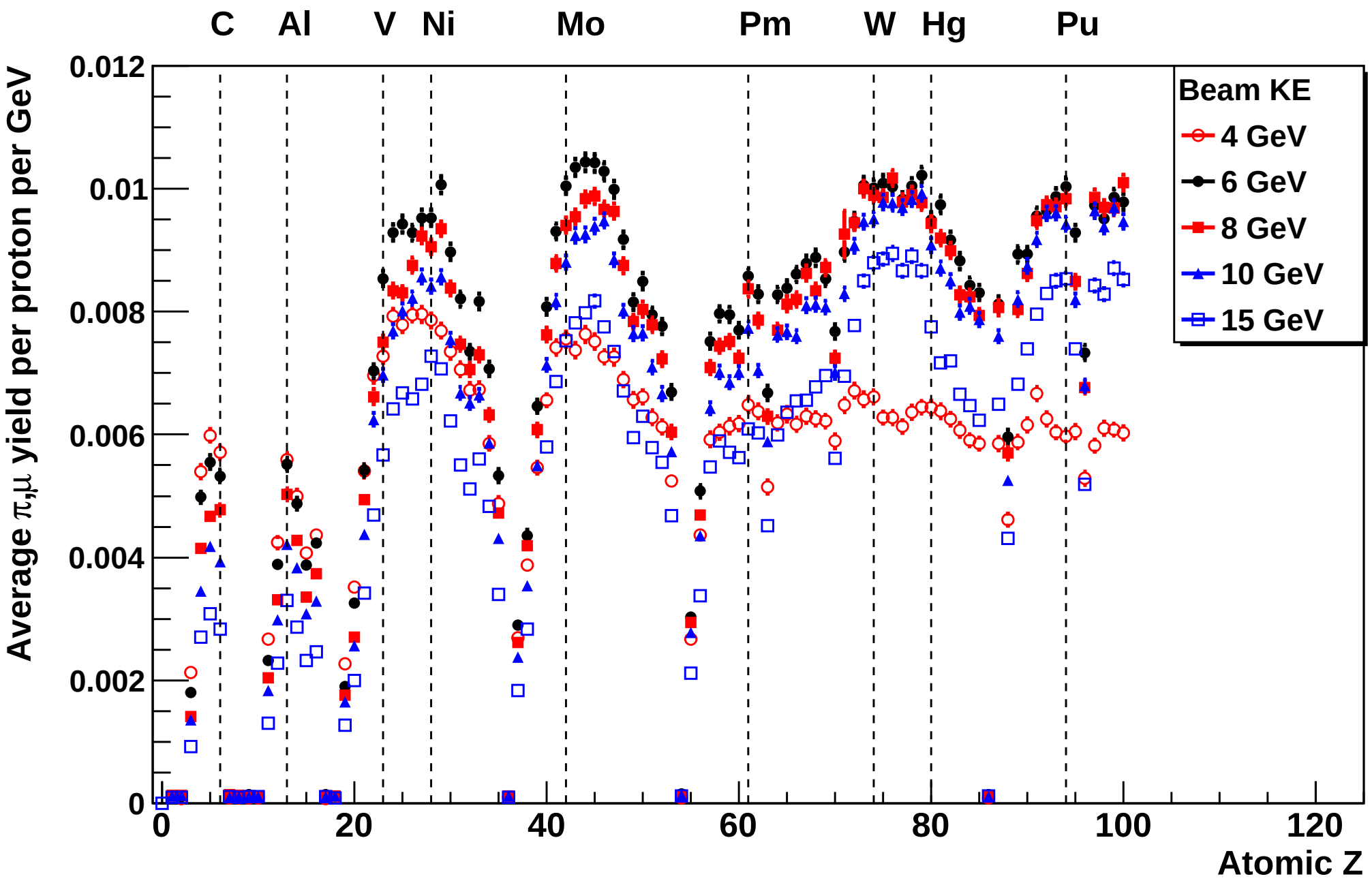
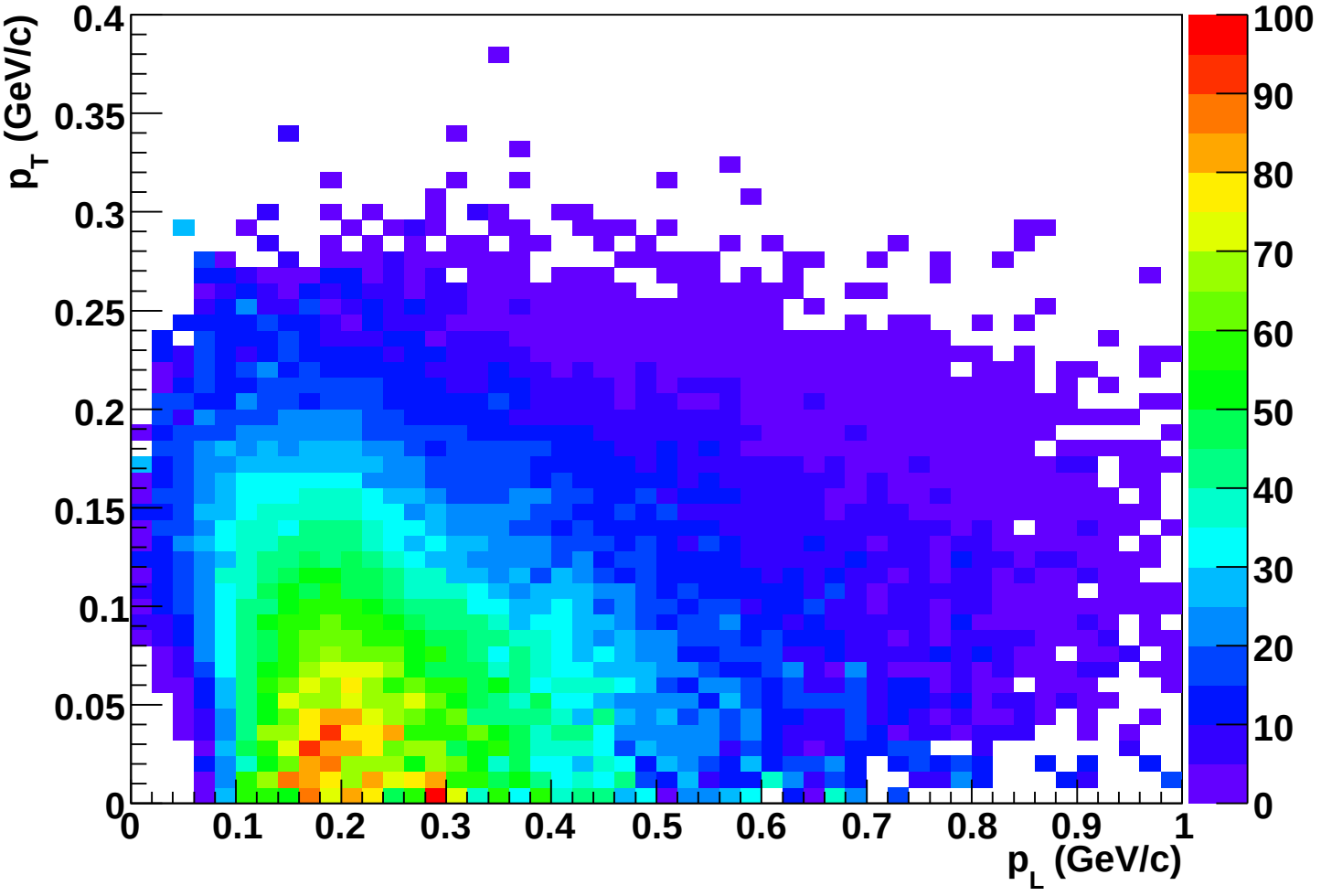
Introduction

- Using MARS (15.07) to investigate π,μ yields for different target materials
- Using Study 2a geometry and (old) ICOOL acceptance probability map
- Assuming all targets (incl. gas or liquid) are cylinders of length 20 cm, diameter 2 cm, tilted at $\theta_z = 100$ mr.
- Beam-target intersect at $z = -37.5$ cm. Cylinder center also at this position.
- Assuming parabolic proton beam: $r_{\rm beam} = r_{\rm target}$, $\theta_{\rm z}^{\rm beam} = 100$ mr.
- Estimating accepted π,μ yields vs atomic Z for different beam KE values


C
Al
V
Ni
Mo
Pm
W
Hg
Pu
Average π,μ yield per proton per GeV
0.012
0.01
0.008
0.006
0.004
0.002
0
0
20
40
60
80
100
120
Atomic Z
Beam KE
4 GeV
6 GeV
8 GeV
10 GeV
15 GeV

Reminder: Probability acceptance map



Probability of π, μ from target going through μ cooling channel

$$\mathcal{P} = \frac{\Sigma_i w_i(\text{pass})}{\Sigma_i w_i}$$

w_i = MARS weight