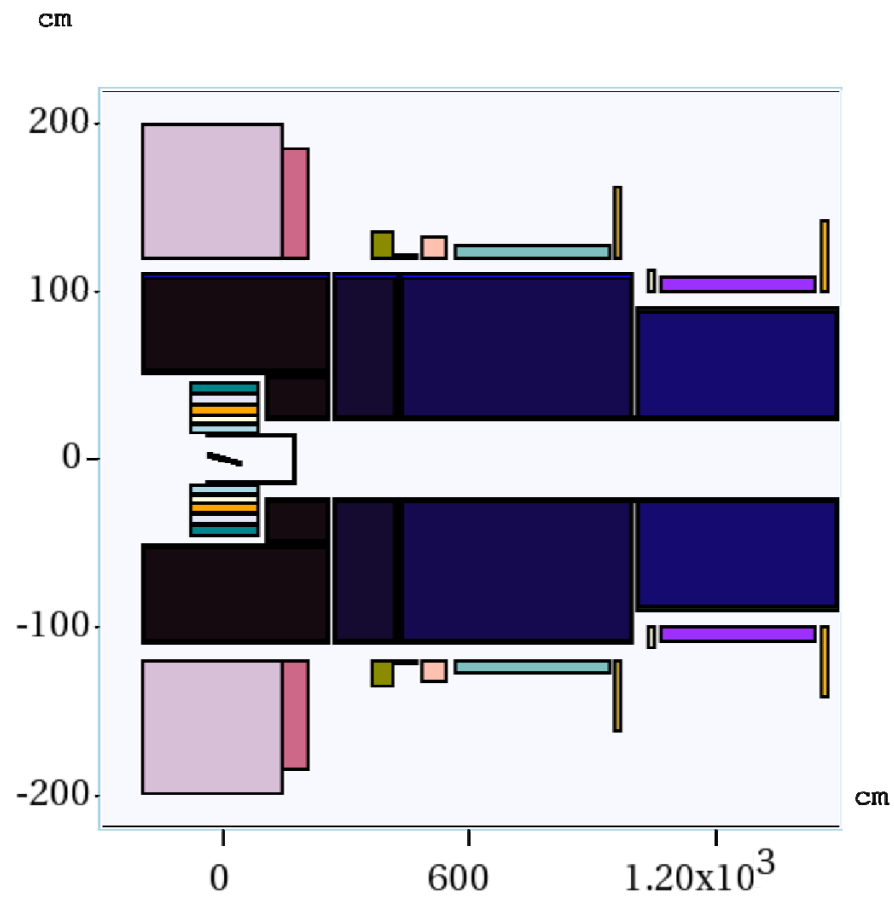# Energy Spectra Comparison

X. Ding
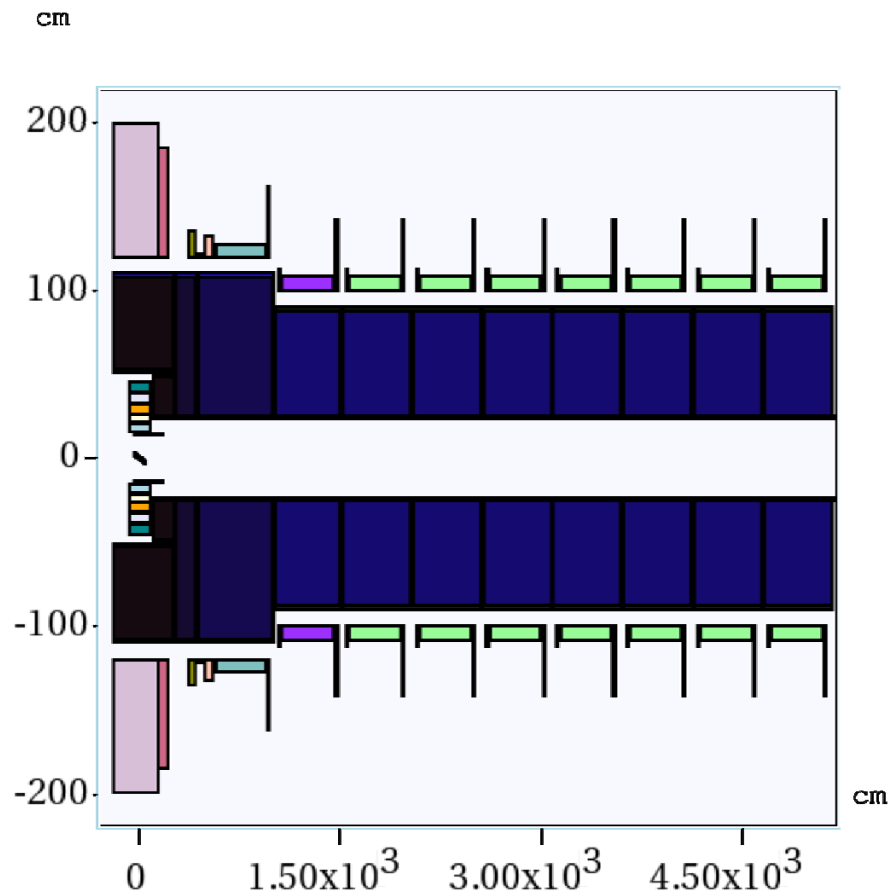
AAG meeting, BNL

July 16, 2015
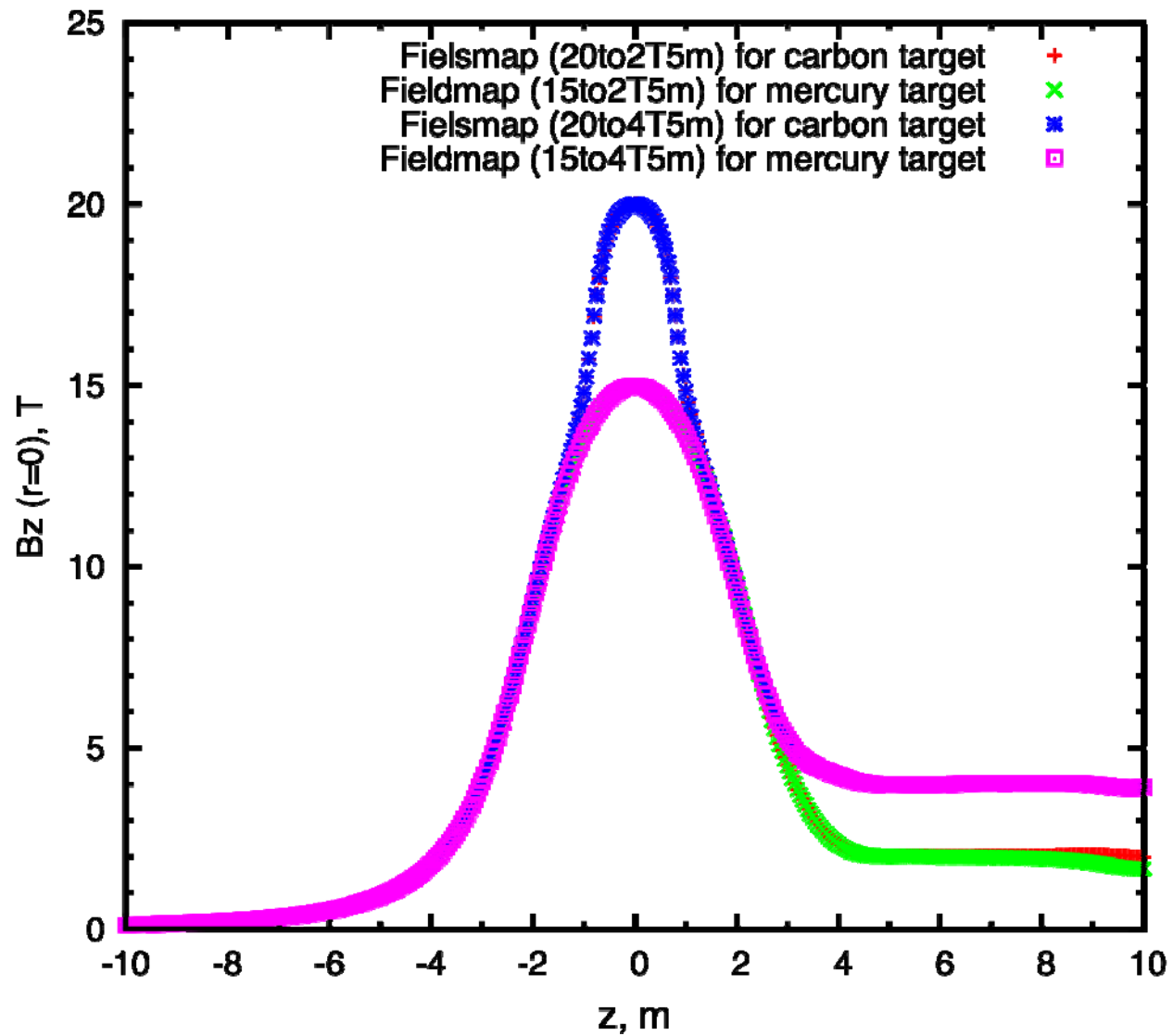
20to4T5m Configuration (z_{max} = 15 m)

20to4T5m Configuration (z_{max} = 52 m)

Fieldmap on SC axis

Method

- Generate simple Gaussian beam with zero emittance (launching at z = -100 cm) by MARS.INP setting and proceed through 20to2T5m and 20to4T5m configuration and transport channel;

- Collect beam at z = 2 m and sum all particles

- Collect beam at z = 50 m and extract the positive muon

SMIN/MTSM/MTSH Cards

- **SMIN STEPEM STEPH**

 STEPEM is step size for boundary finding

  STEPH is the step size for the physics tracking.

  MARS manual recommends STEPH about 10 times STEPEM, which should be about 0.1 times length of smallest volume

- Two methods to set very small step size for tiny objects like BE windows. The 1st method is to set SMIN card with small step size for all materials (slow running speed). The second method is only set small step size for thin BE windows with MTSM (Real variables giving the step length for boundary localization, applied only to specific materials.) and MTSH card (Real variables giving the pilot step length, applied only to specific materials.).

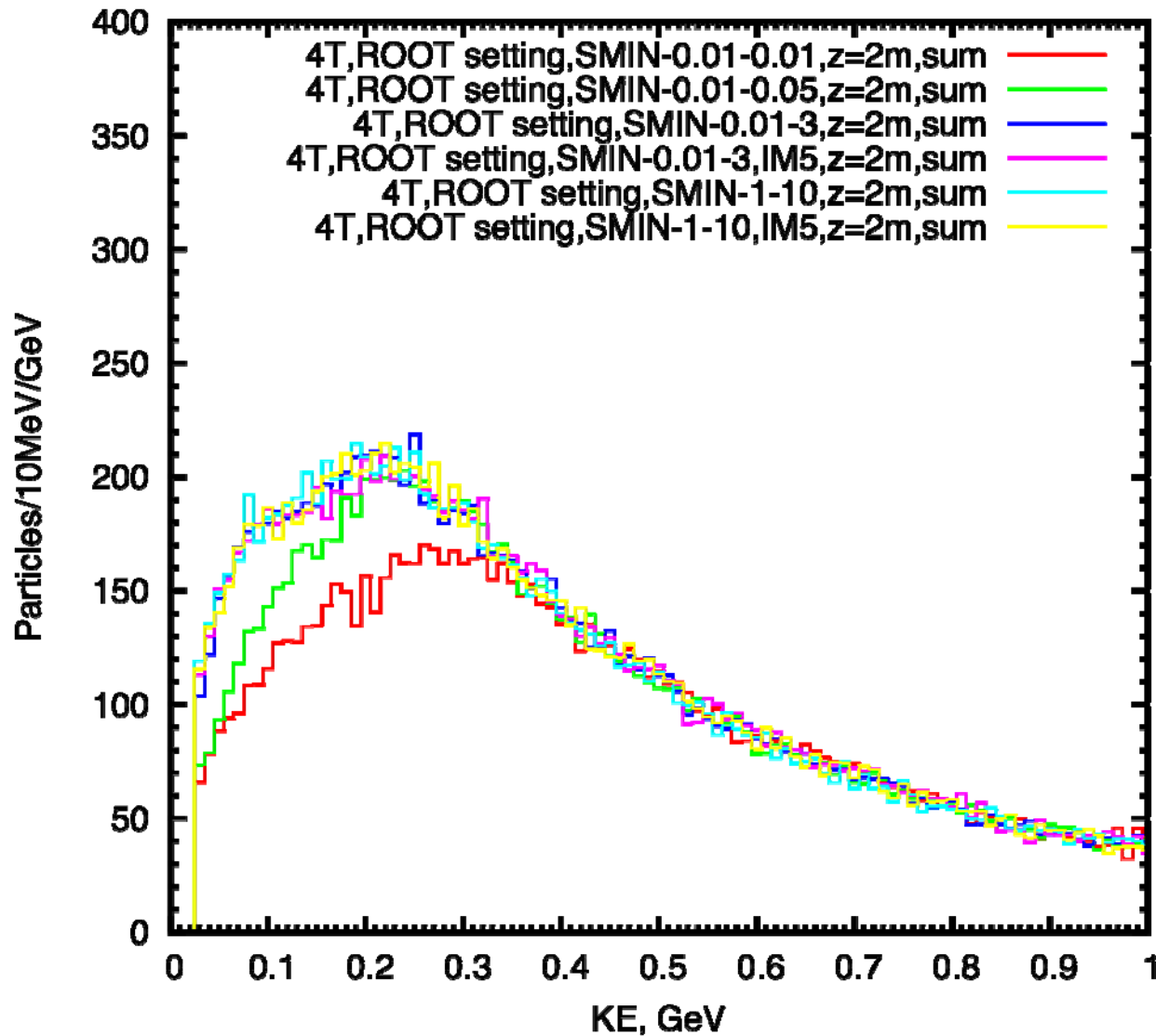# Particle Production at *z* = 2 m
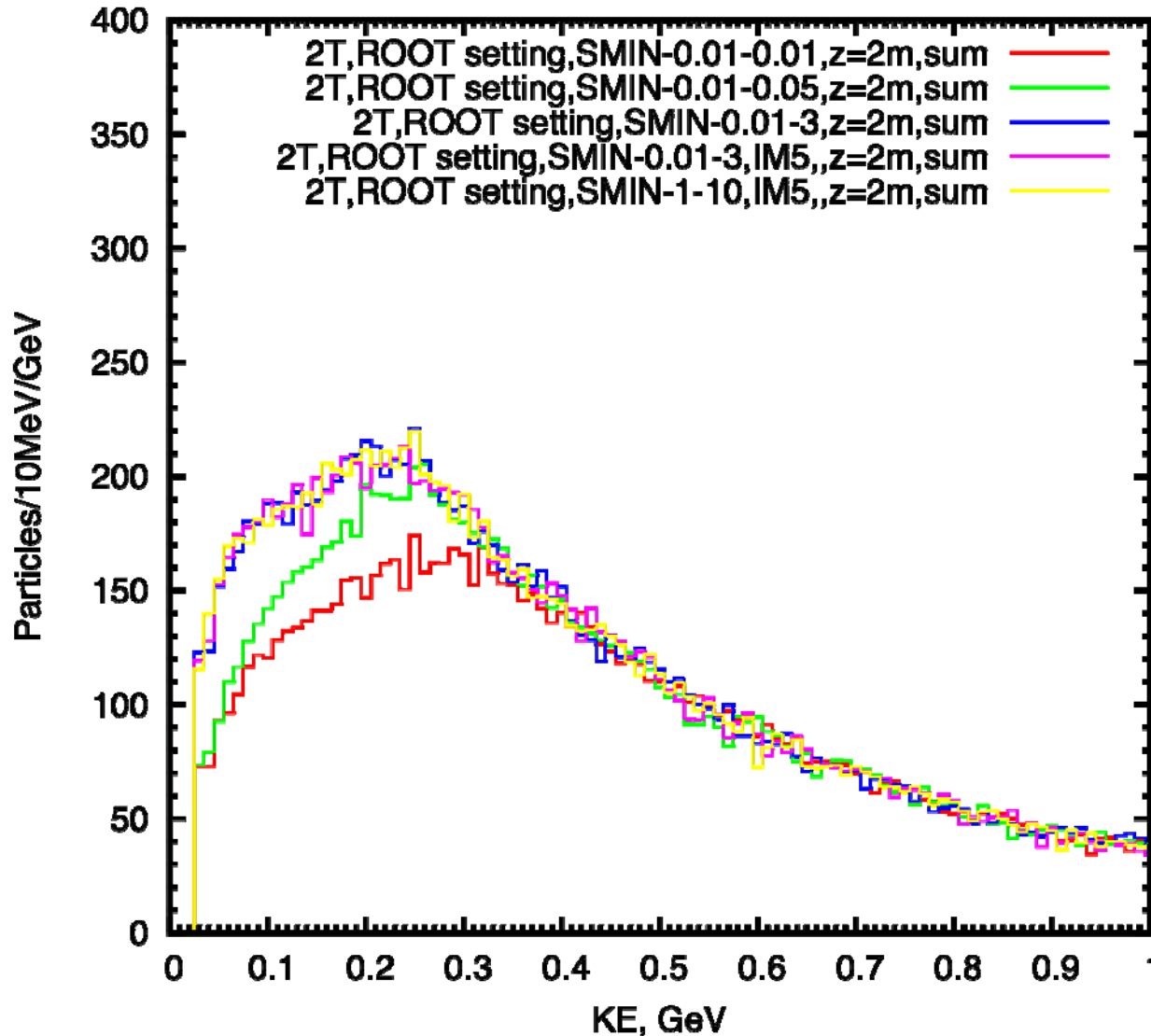
IM5:
MTSM = 0.01 and
MTSH = 0.01 for BE
windows

Maybe need finer step
in the target as well as
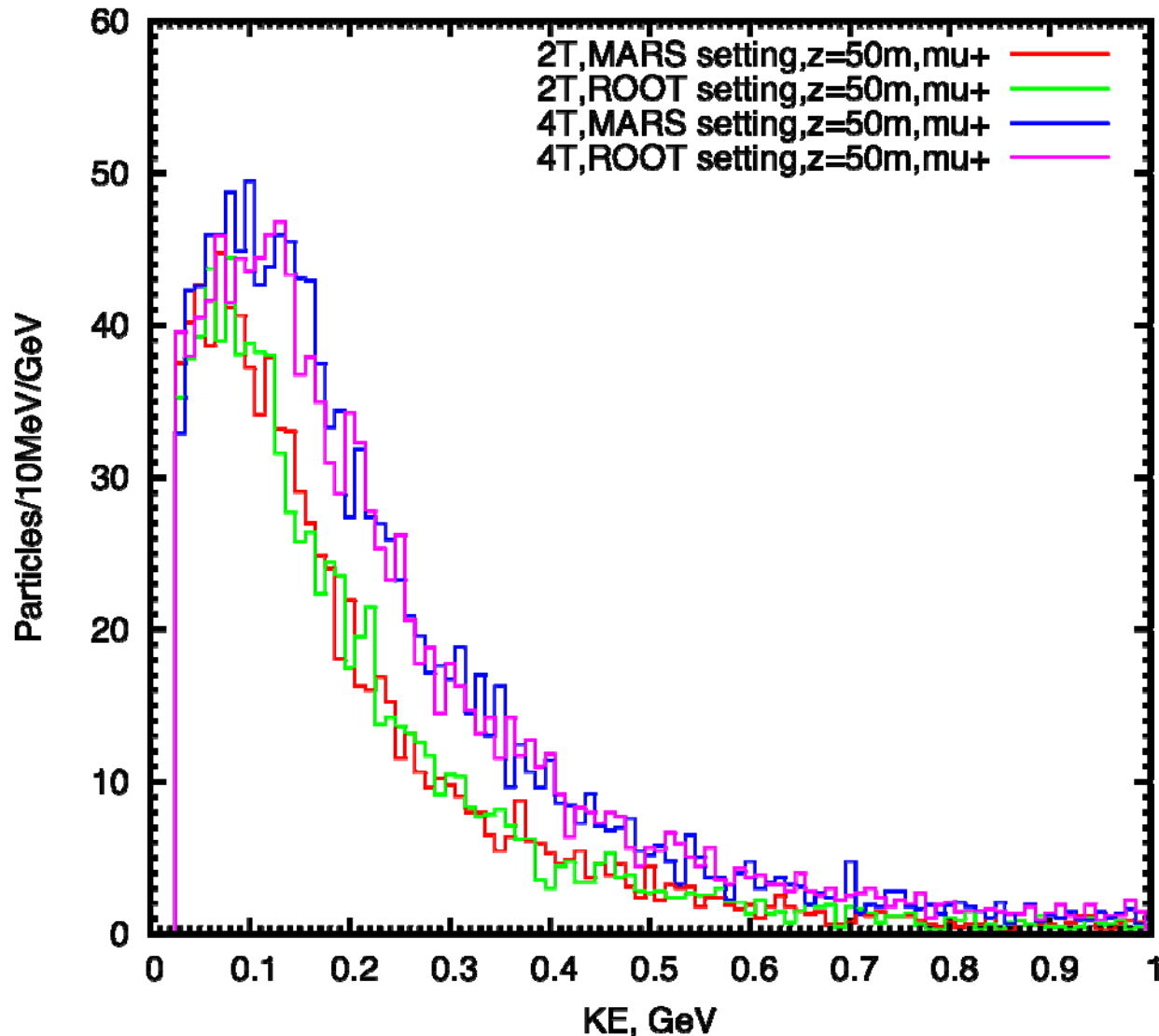in the Be windows!

Particle Production at *z* = 2 m

IM5:
MTSM = 0.01 and
MTSH = 0.01 for BE
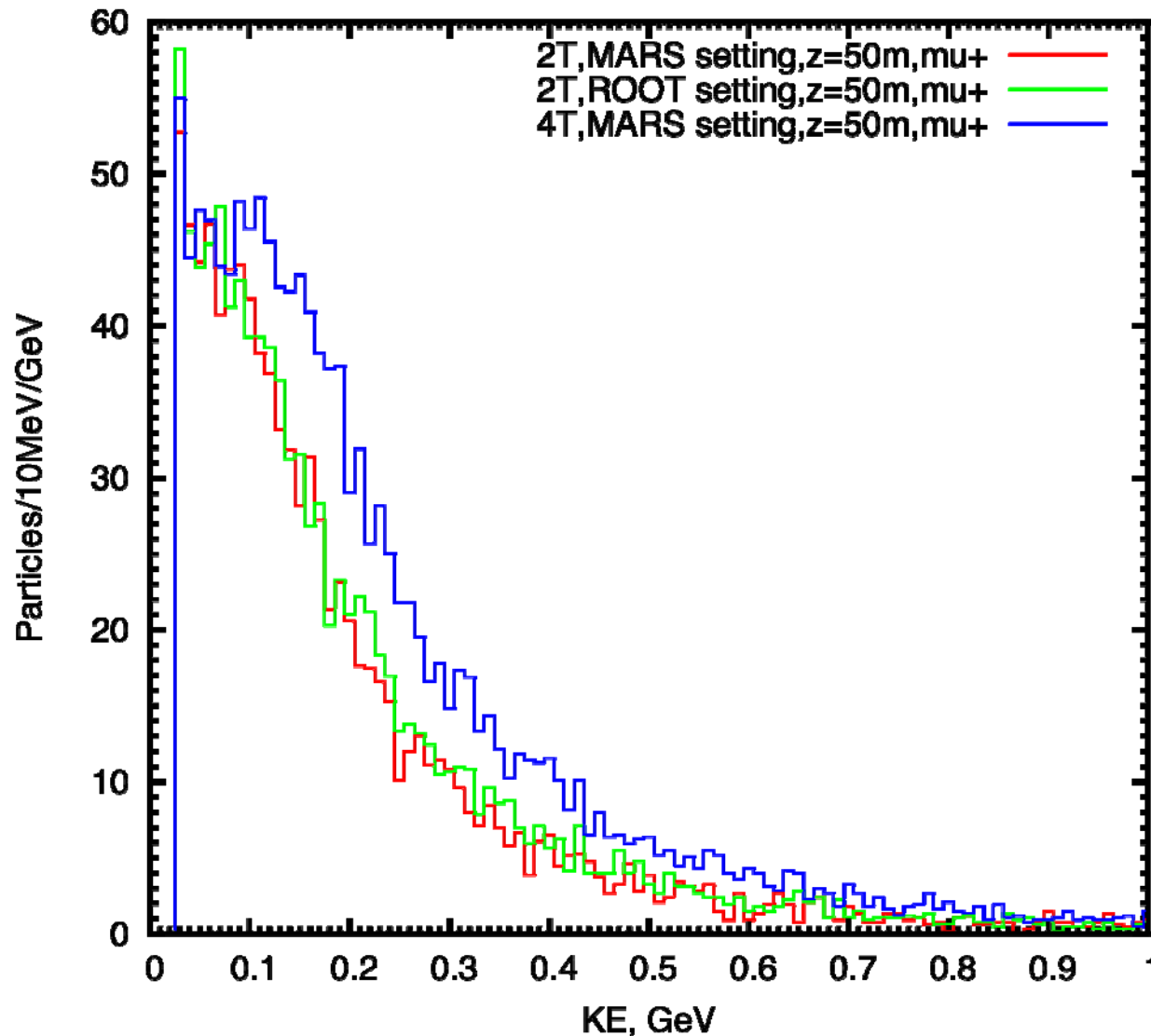windows

Mu⁺ at *z* = 50 m
full BE Windows, SMIN 0.01 0.01

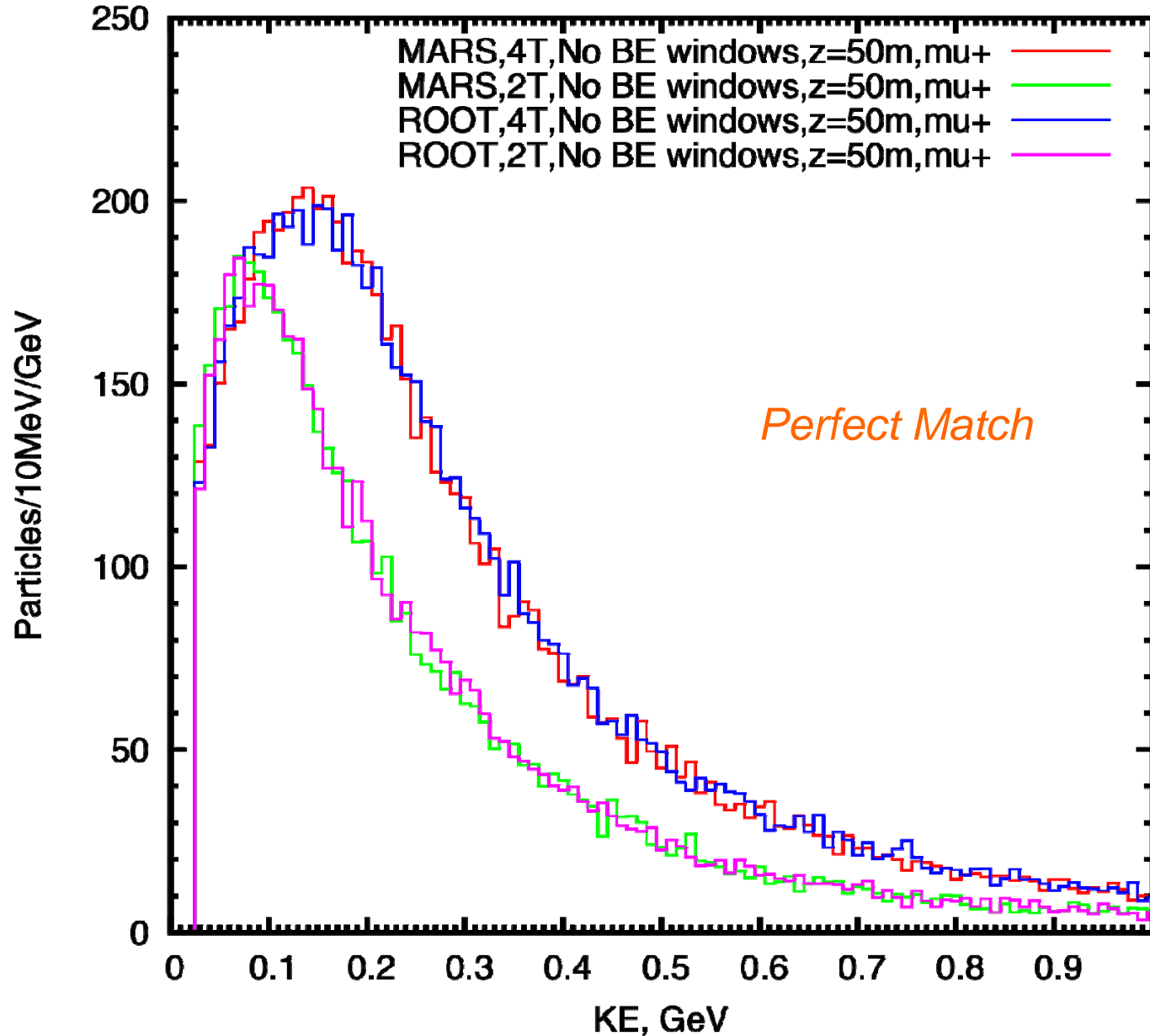Results similar for MARS and ROOT setups with fine steps

Mu⁺ at *z* = 50 m
no BE Windows, SMIN 0.01 0.01

Results similar for MARS and ROOT setups with fine steps
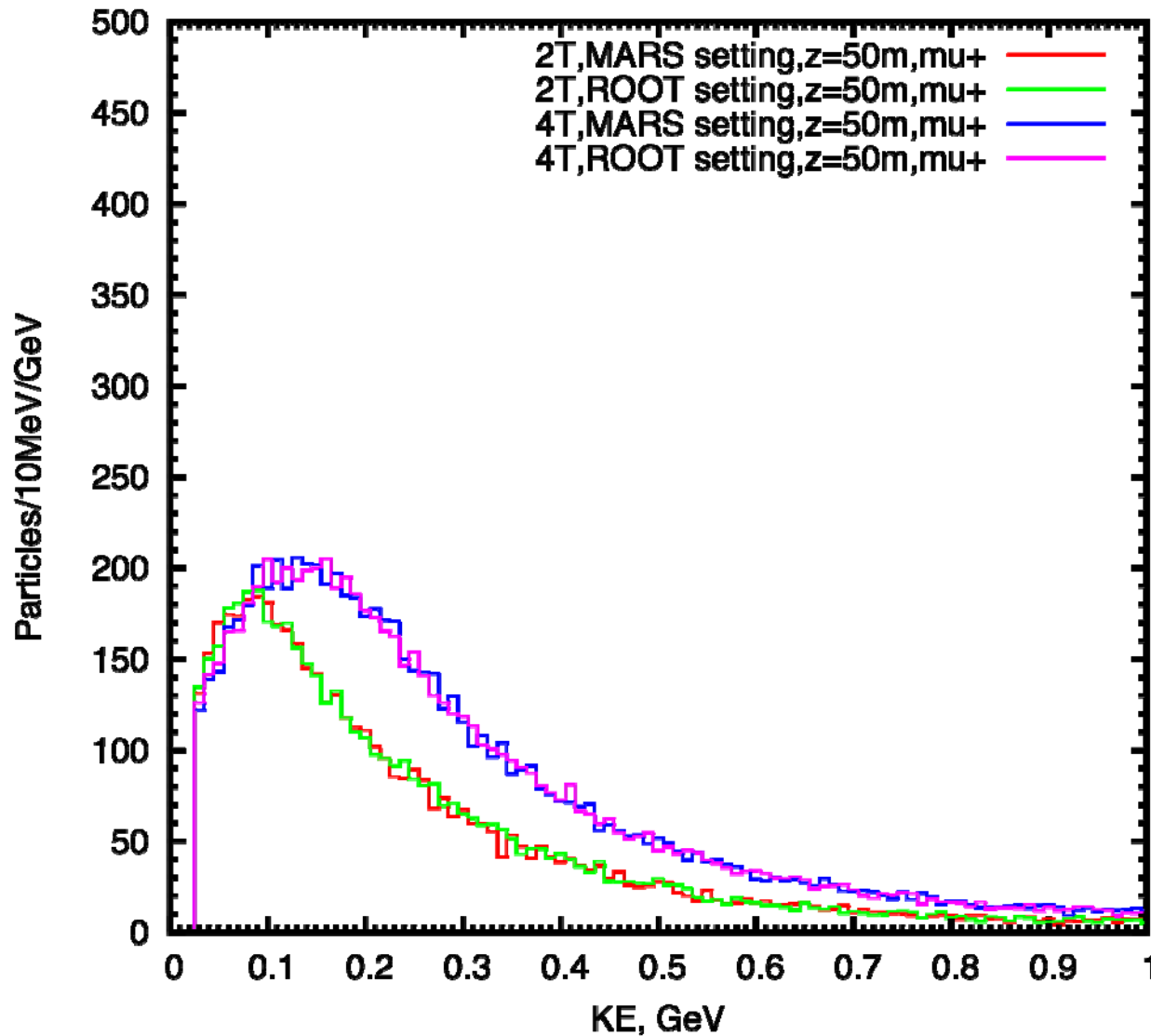
Setting without BE window (mu⁺)

SMIN 0.01 3

Perfect Match

Results similar for MARS and ROOT setups with fine STEPEM, even with larger STEPH
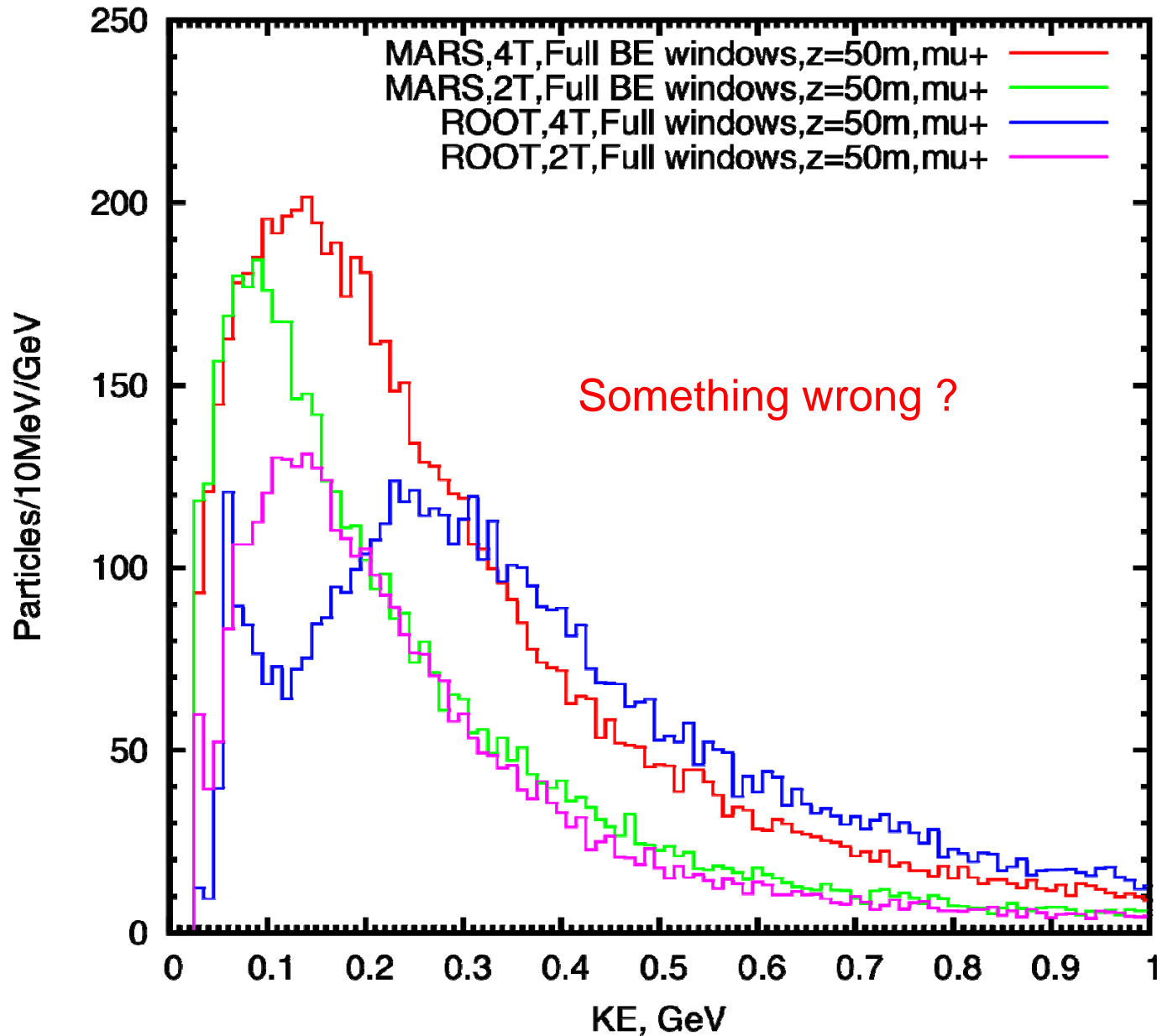
Setting without BE window (mu⁺)

SMIN 0.01 3 (MTSM & MTSH: 0.01 for BE window)

Results similar for MARS and ROOT setups with fine STEPEM, even with larger STEPH
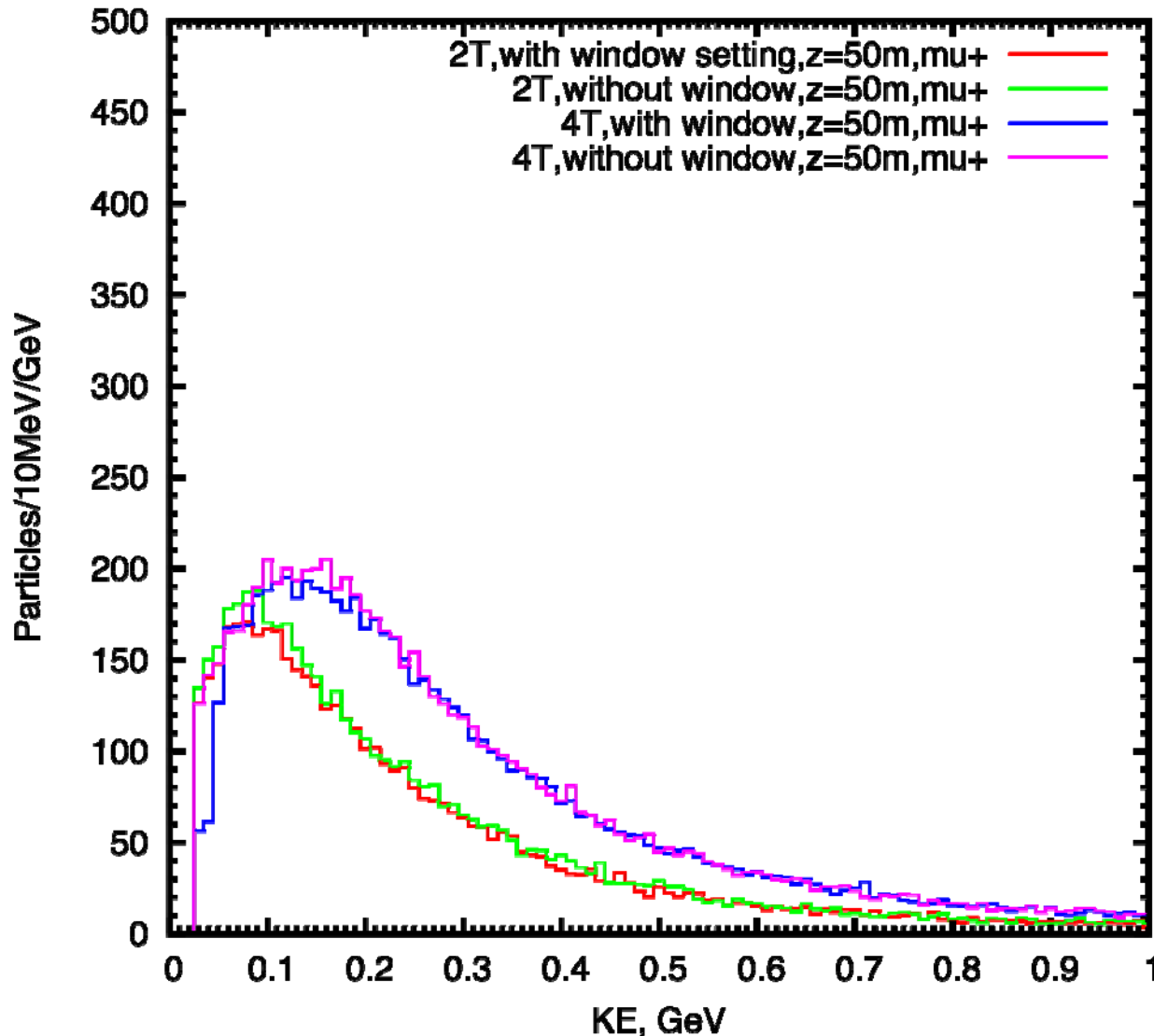
Setting with BE window (mu⁺)

SMIN 0.01 3

STEPH too large to deal with the Be windows
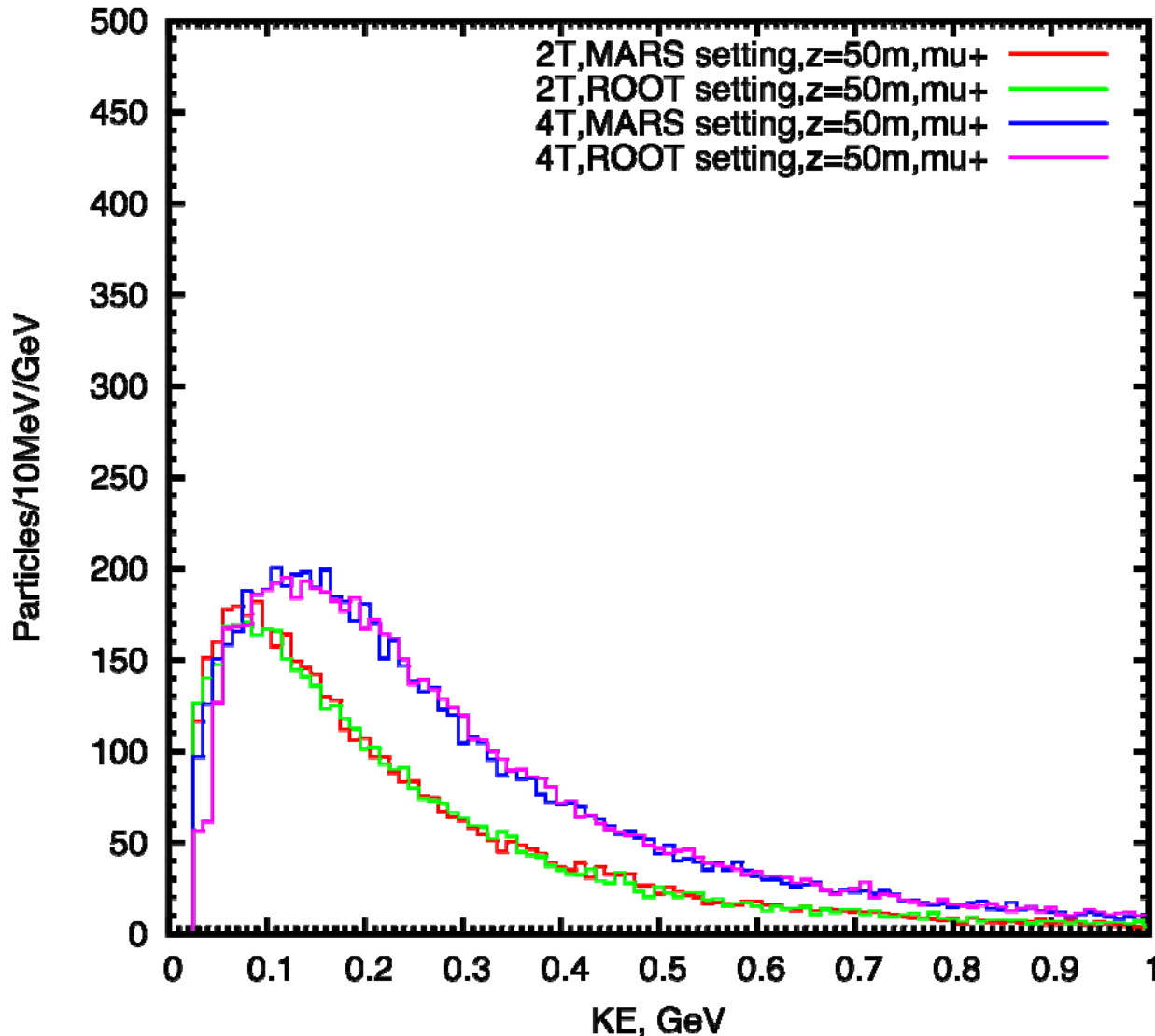
Something wrong ?

With vs. without BE window (mu⁺)
SMIN 0.01 3 (MTSM & MTSH: 0.01 for BE window)

Target may still not be dealt with well.

Setting with BE window (mu⁺)
SMIN 0.01 3 (MTSM & MTSH: 0.01 for BE window)

Better processing of Be windows.

Target may still not be dealt with well. STEPH is too large

Should also make special setup for target region.   Then use larger STEPH outside of target and Be windows.