CYGNUS Geant4 Simulation

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Muon induced neutrons

Improved results by using coincidence in the gas to veto events

So far no events in the region of interest (1-100keVr) in ~81 days

Current upper-limit < 3.49×10^{-7} s (90%CL)

Next steps:

Running more events for the muon sim
Completing the draft of the background section
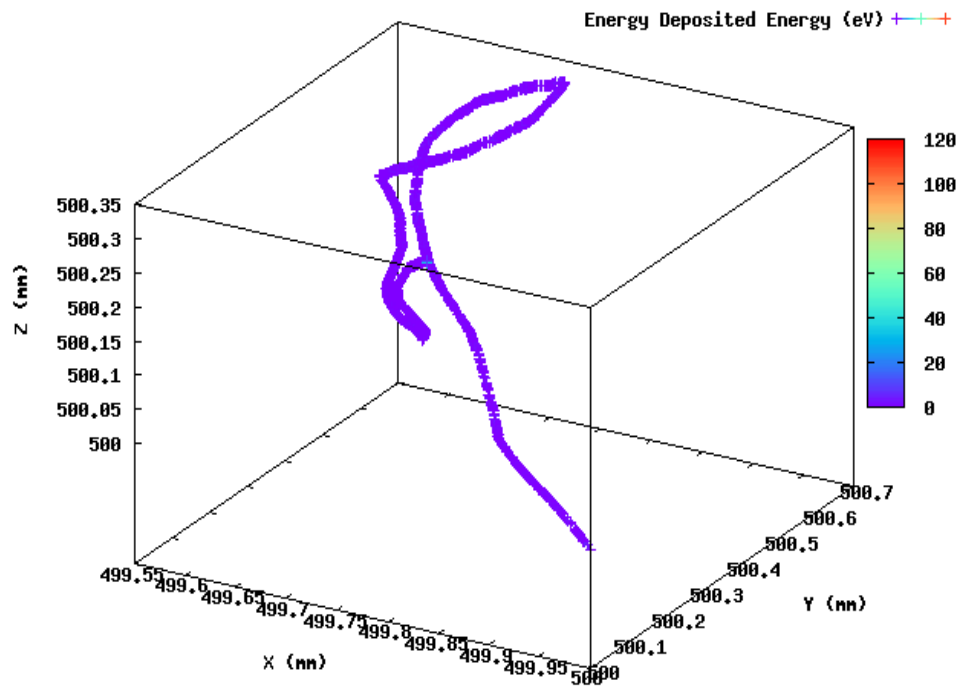
Track discrimination

I looked at e- and NR tracks with Geant4 in 560Torr He + 200Torr SF6

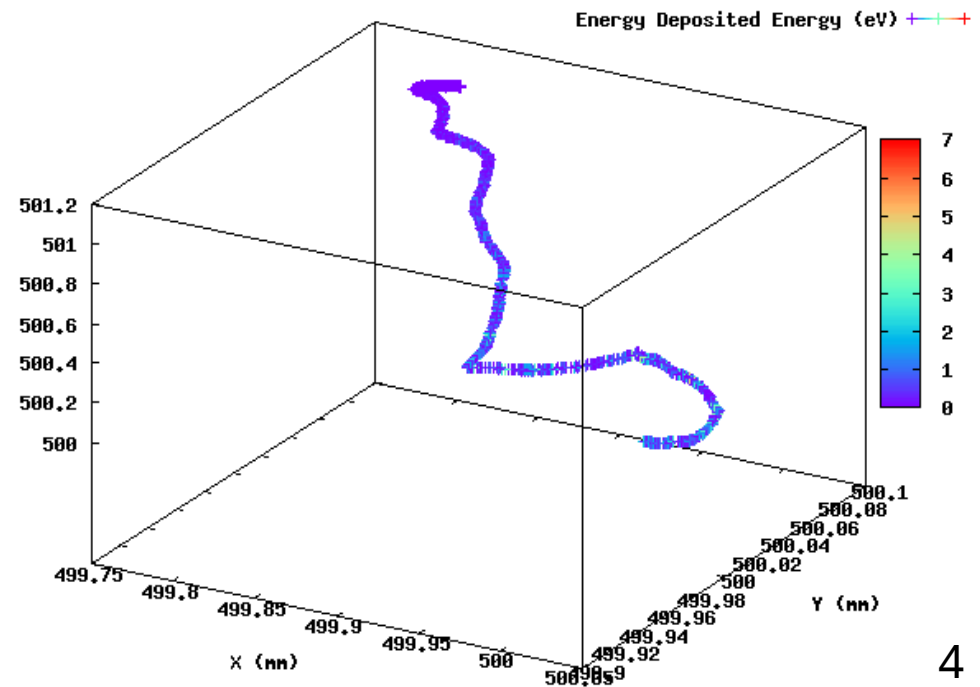Can we use the pulse shape to reduce the gamma background ?

Track discrimination

Problem #1: Different physics lists give different results
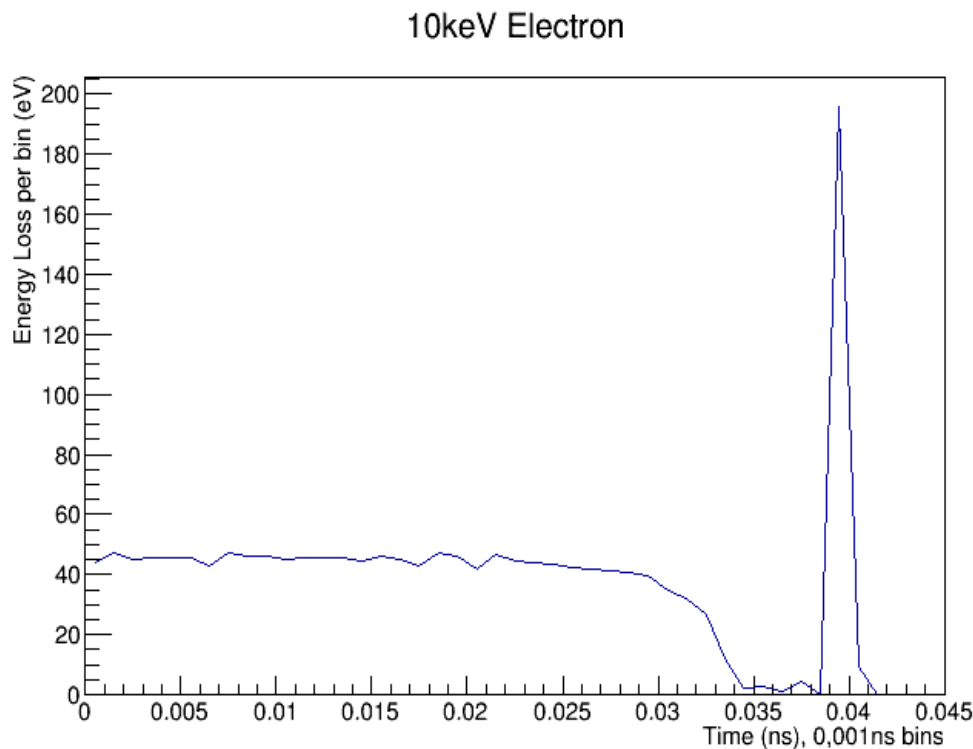
Livermore Low E models

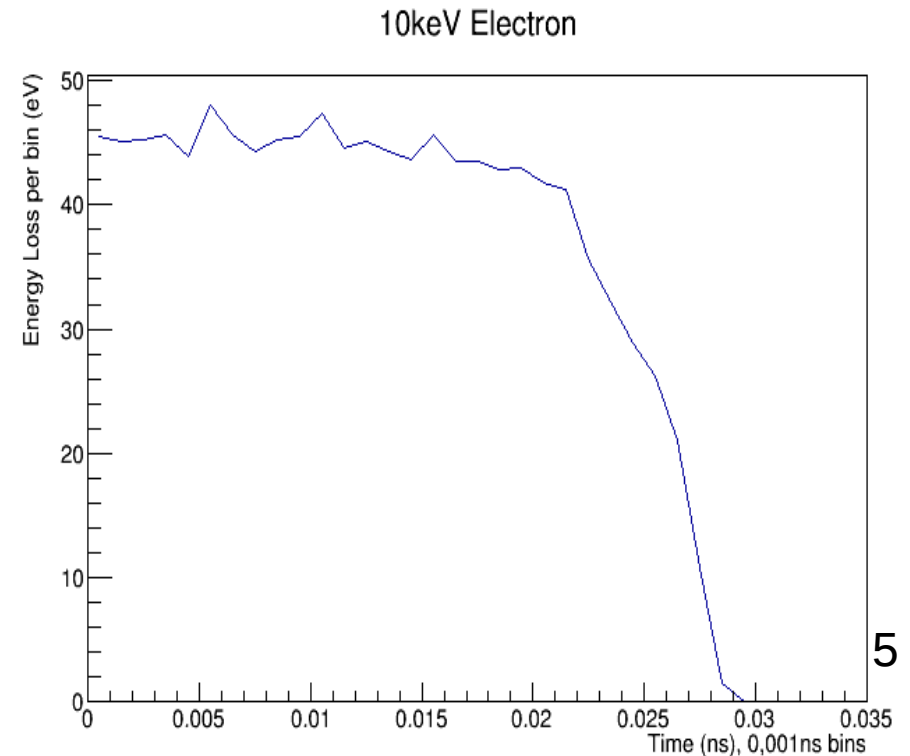G4Shielding

Track discrimination

Problem #1: Different physics lists give different results
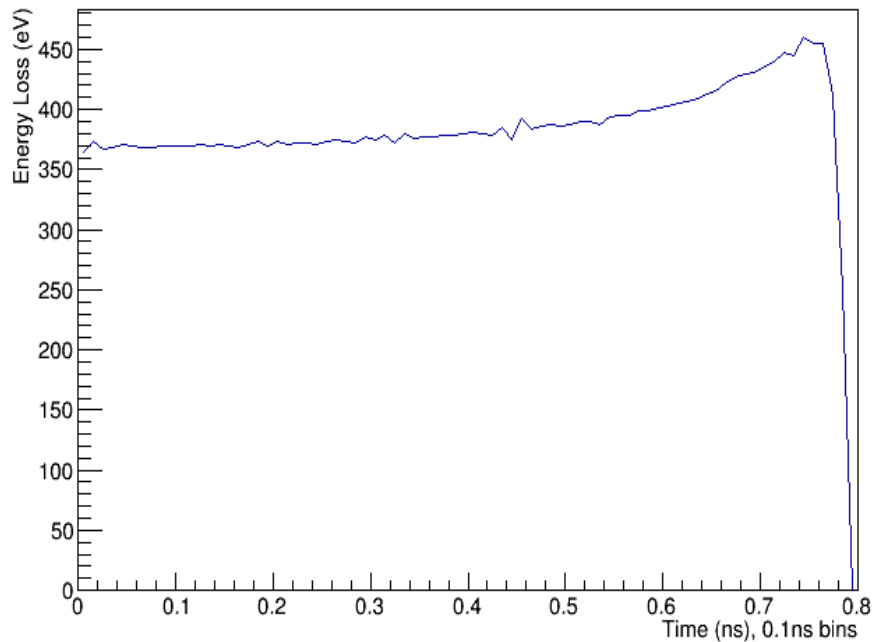
10 keV electron

Livermore Low E models

G4Shielding

5

Track discrimination

Problem #1: Different physics lists give different results
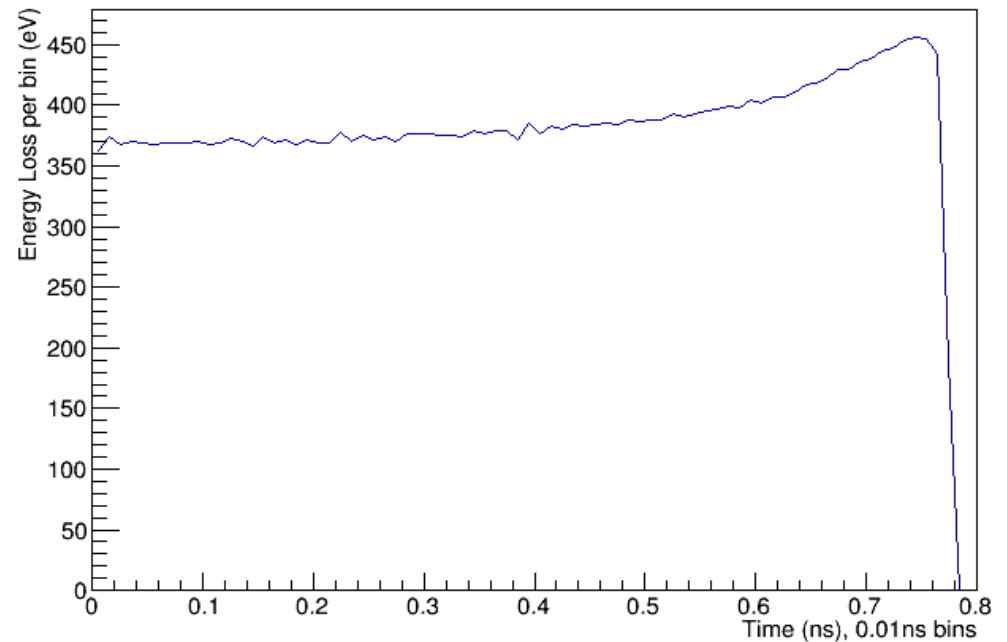
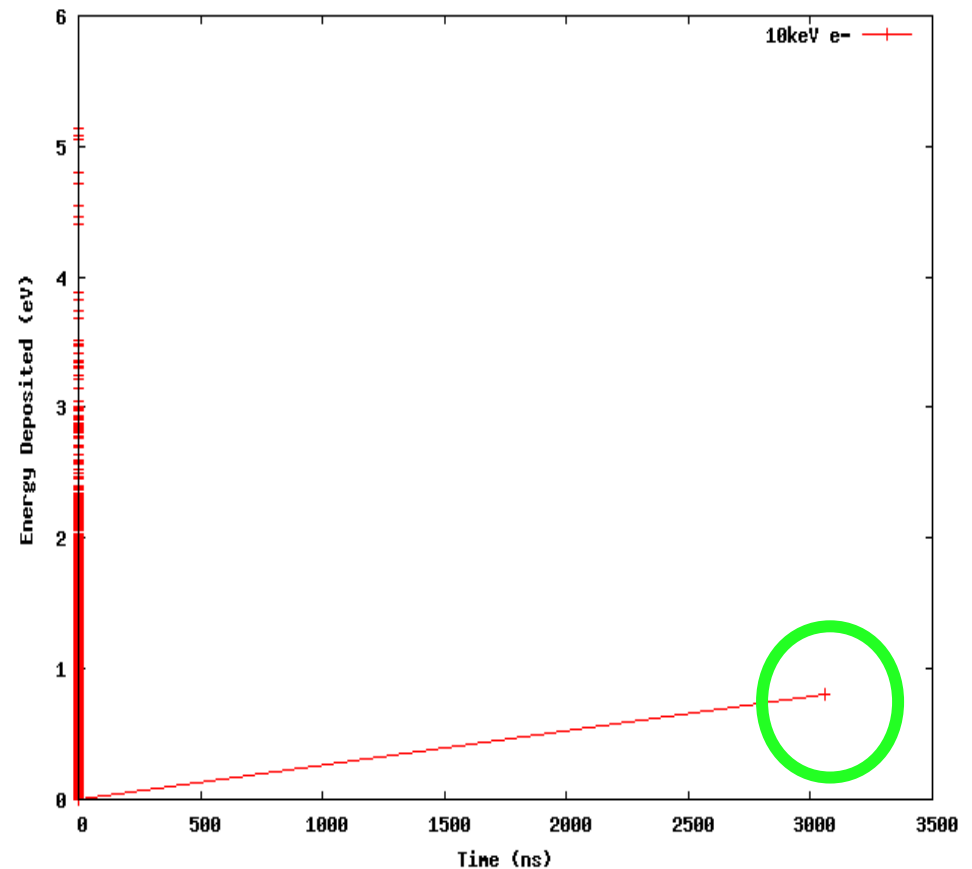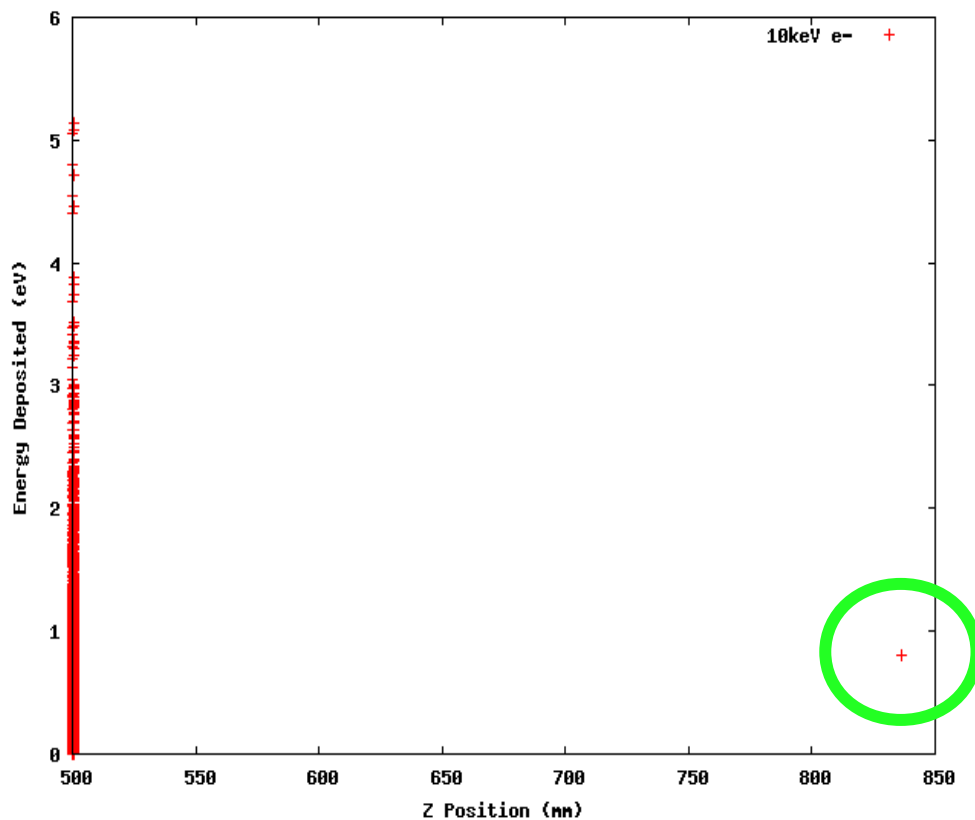The problem is only at low energy

Livermore Low E models
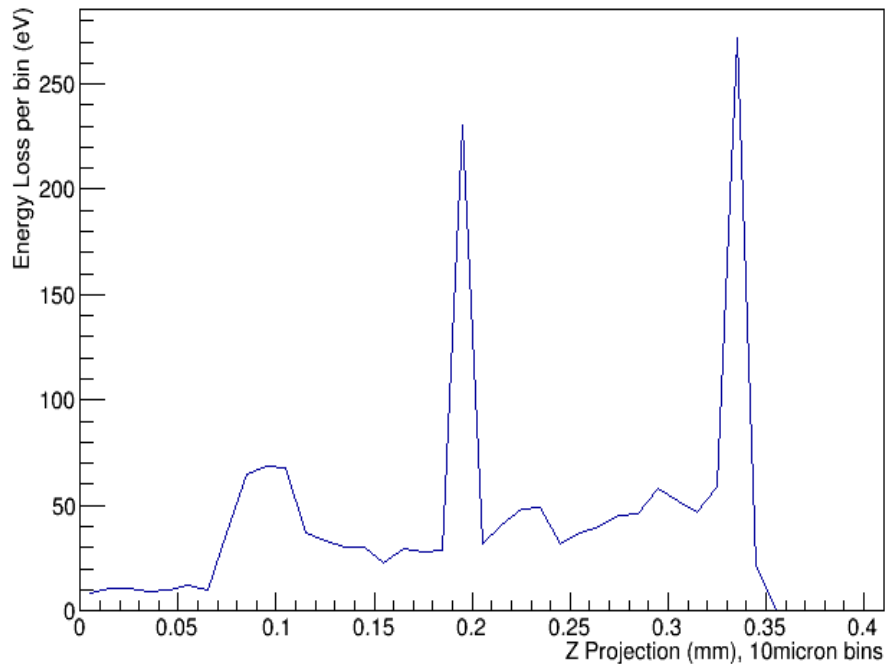
G4Shielding

Track discrimination

Problem #2: Shielding has weird artefacts

Track discrimination

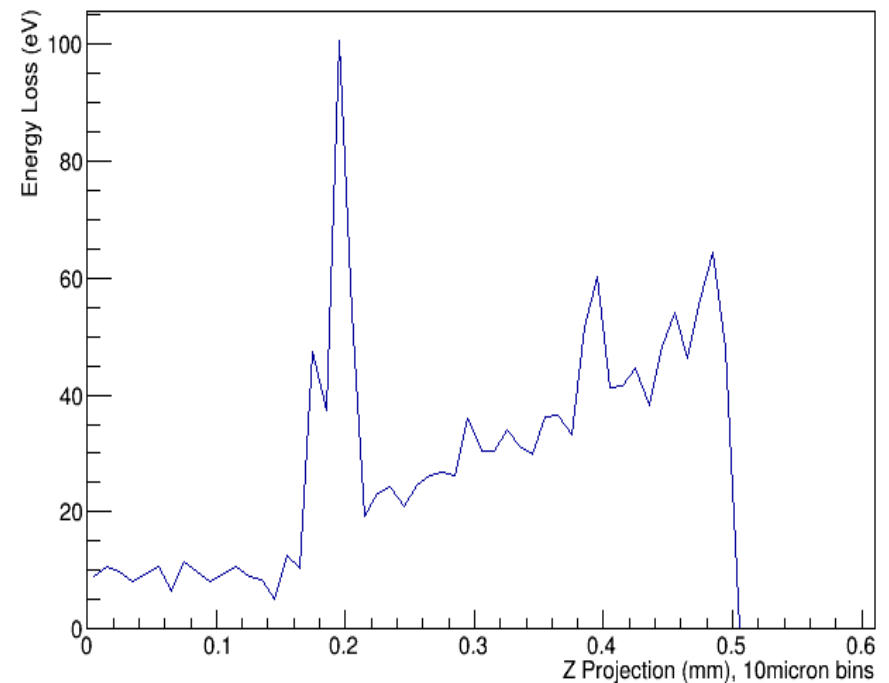Straggling (sometimes) modifies the shape of the projected signal

Livermore

Shielding

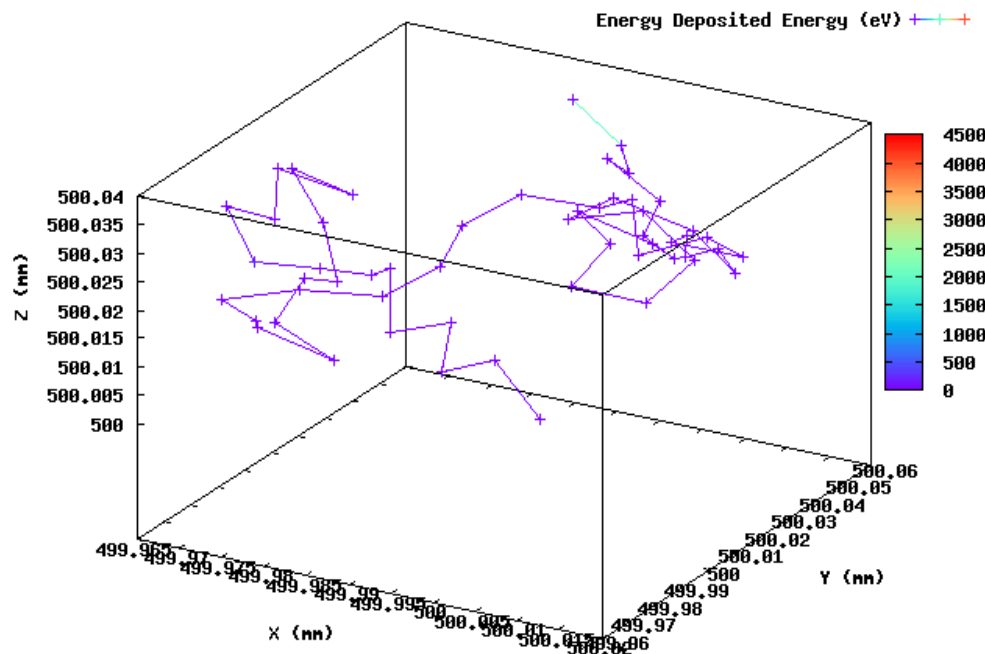# Track discrimination
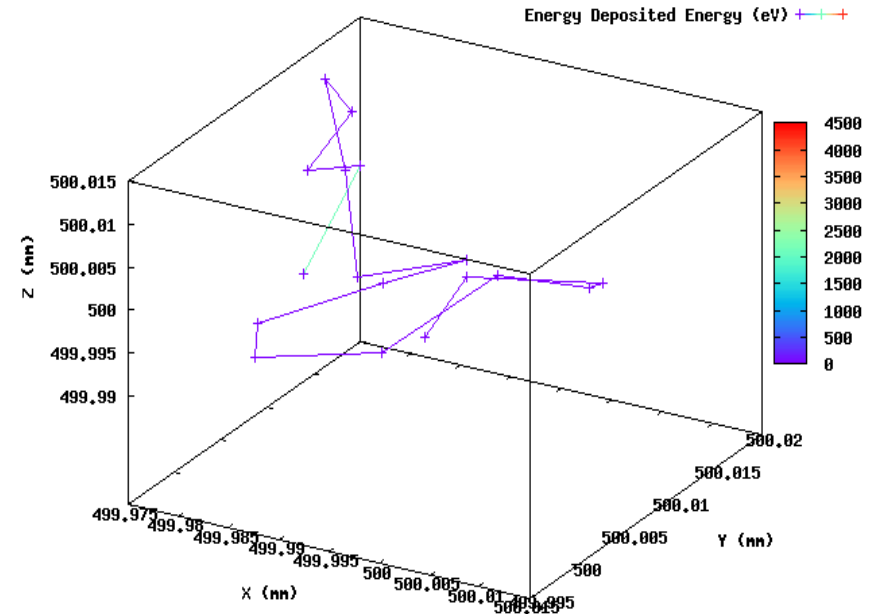
F recoils: 10 keV

Around 9k- 11k steps per tracks, many with $E_{dep}=0$

Livermore Low E models

G4Shielding

Track discrimination
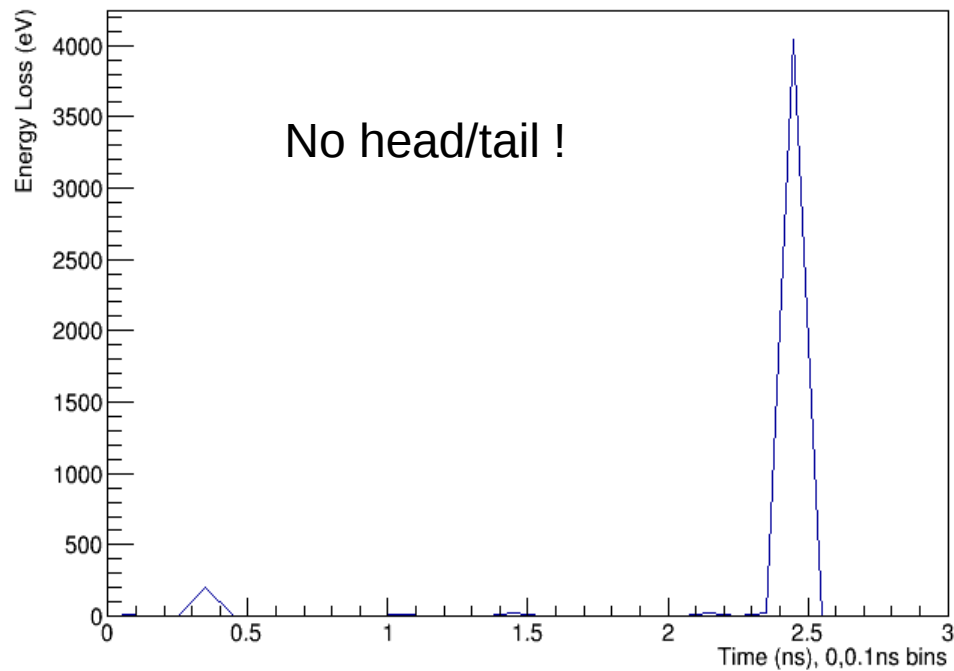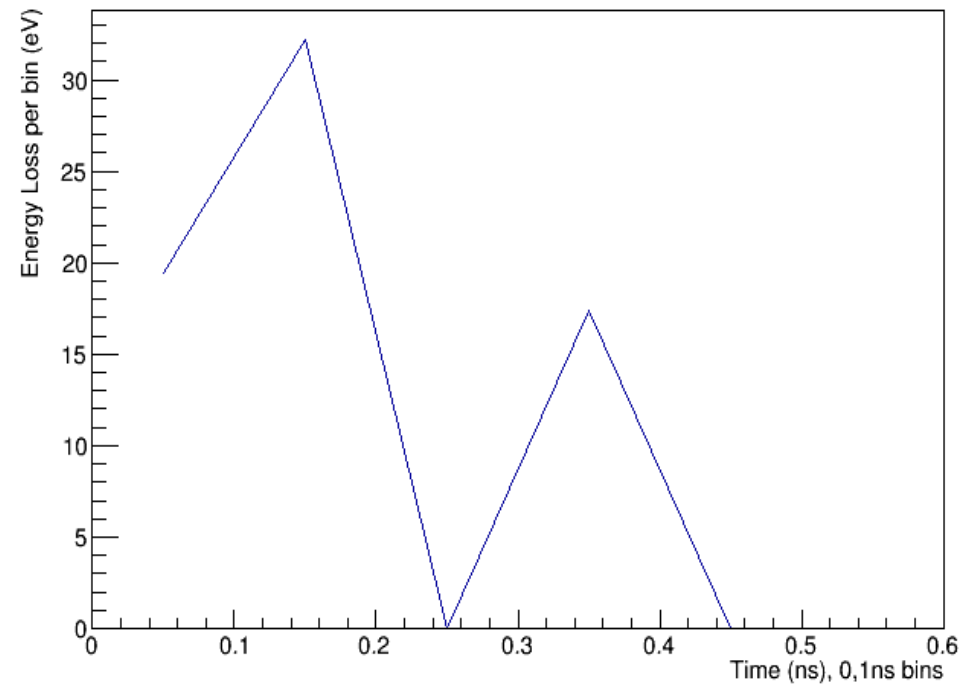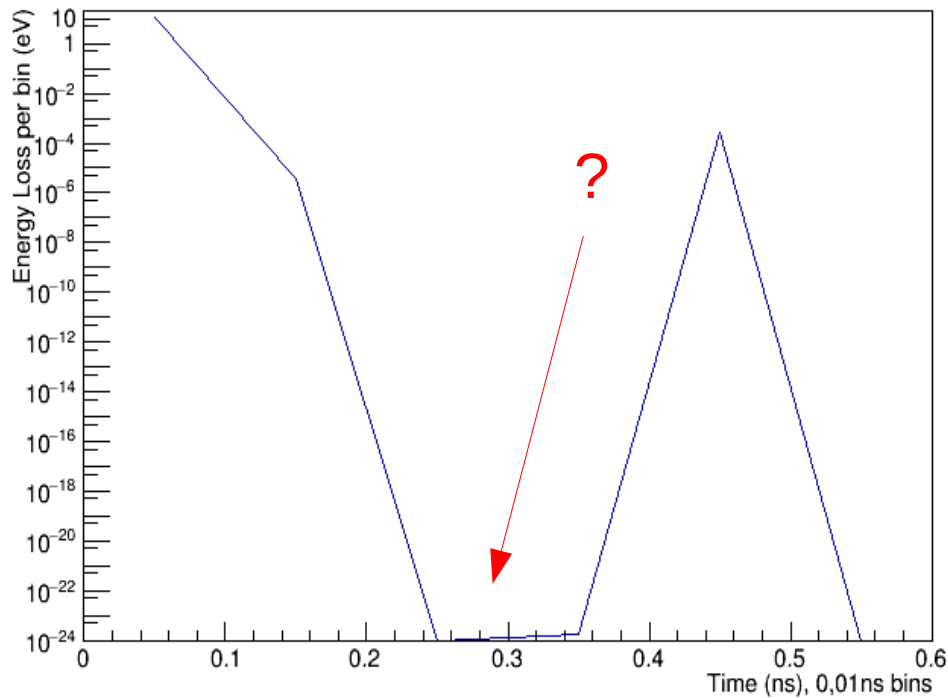
F recoils: 10 keV

Livermore Low E models

G4Shielding

10keV F19

10keV F19

No head/tail !

Track discrimination

F recoils: 100 keV, G4Shielding