Follow up on two-track event shown on Tuesday

Clarence Wret
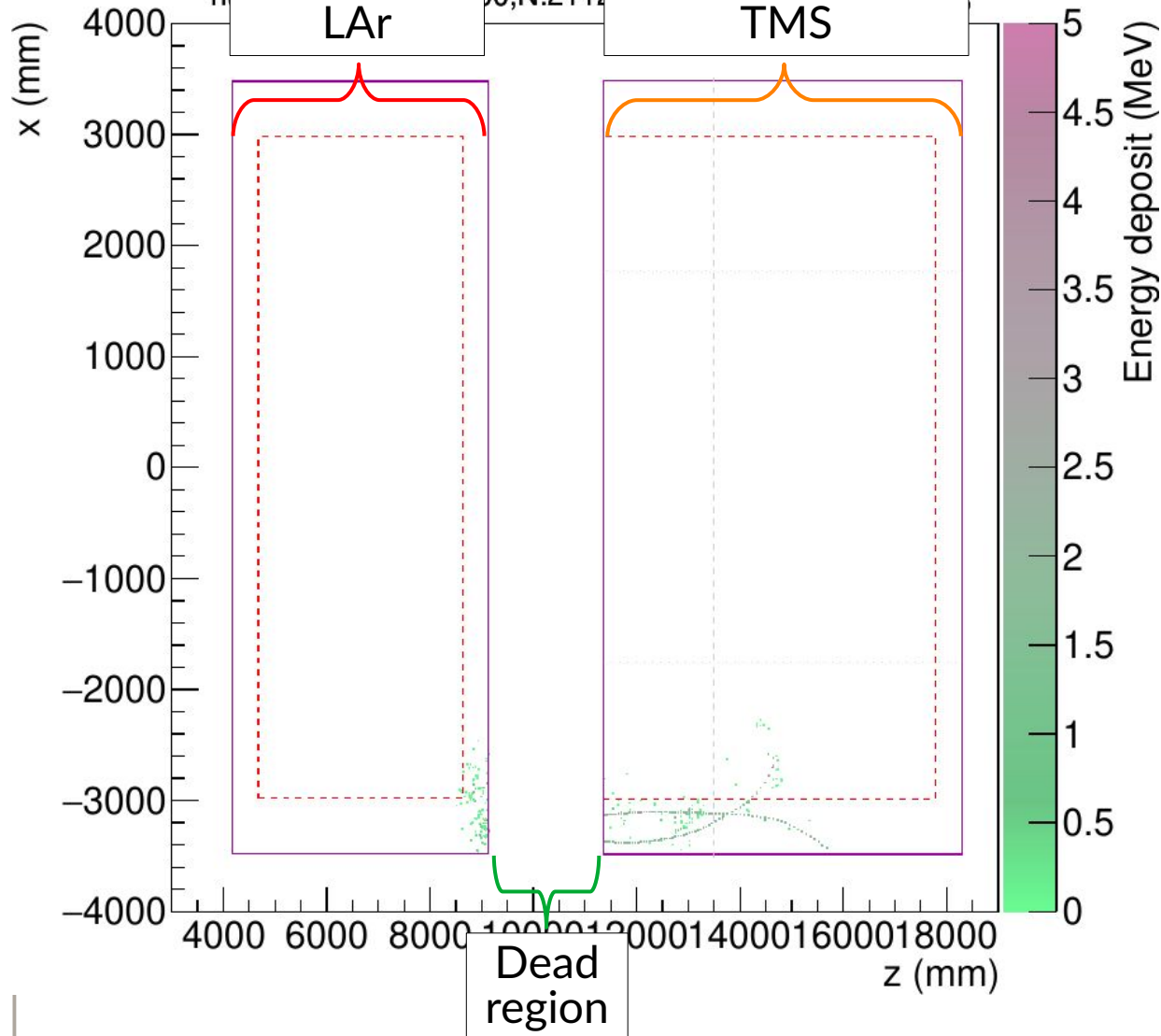
DUNE TMS meeting

July 29 2021

Introduction

- Event 418 in
  `/pnfs/dune/persistent/users/marshalc/LArTMSProductionJun23withLArCV/`
  `edep/FHC/00m/00/neutrino.0.edep.root`

Event 418, ν PDG: -14, E_ν=6.73 GeV

Tom guessed this might be a di-muon event, where a pion has decayed in between LAr+TMS dead region

I naively thought it was a mu+pion event, perhaps coherent

Extended the true particle stack in a TMS event to include all the G4 trajectory points
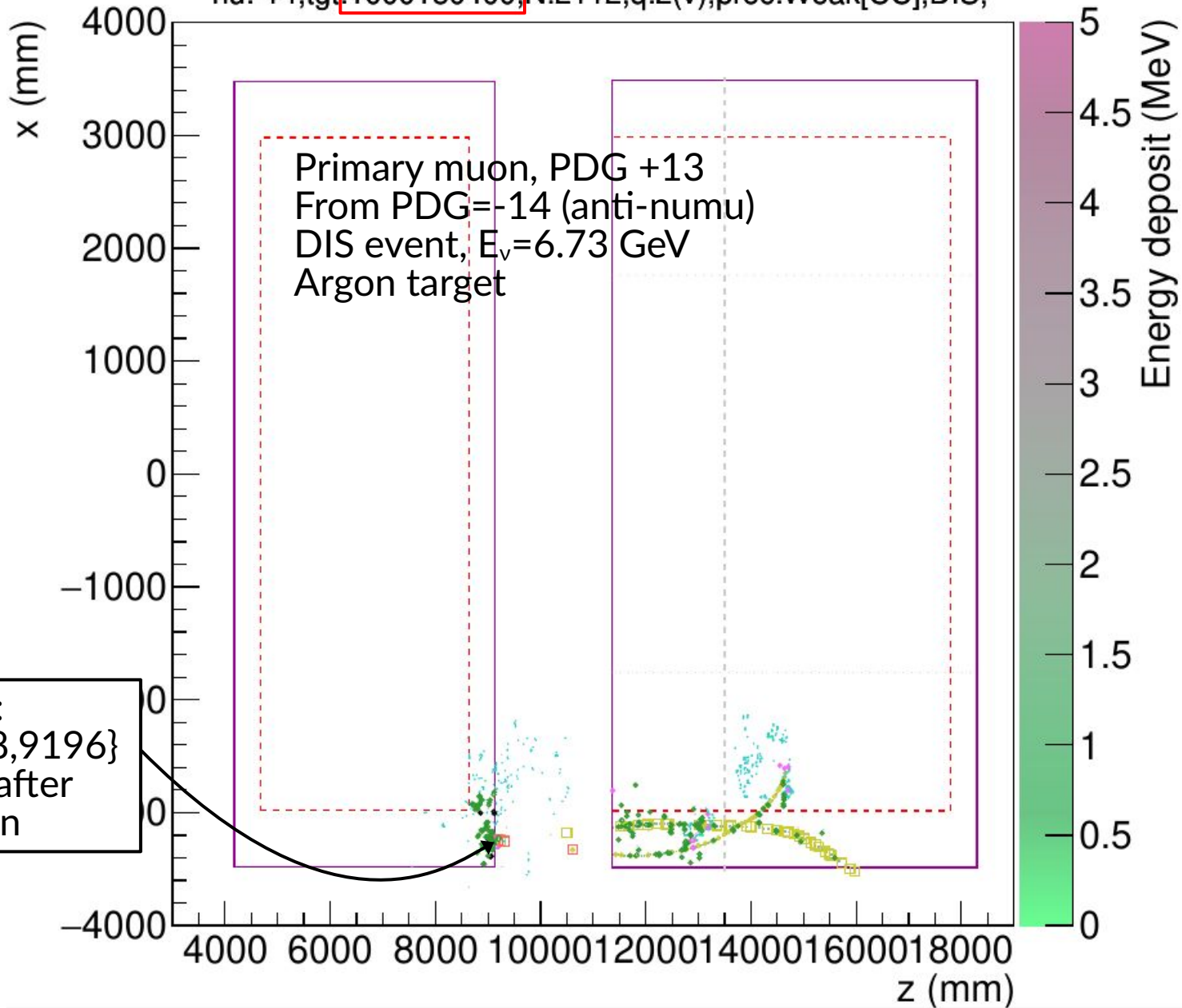
Added trajectory plotting to "event display"

Clarence Wret

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Introduction

Event 418, ν PDG: -14, E_ν=6.73 GeV
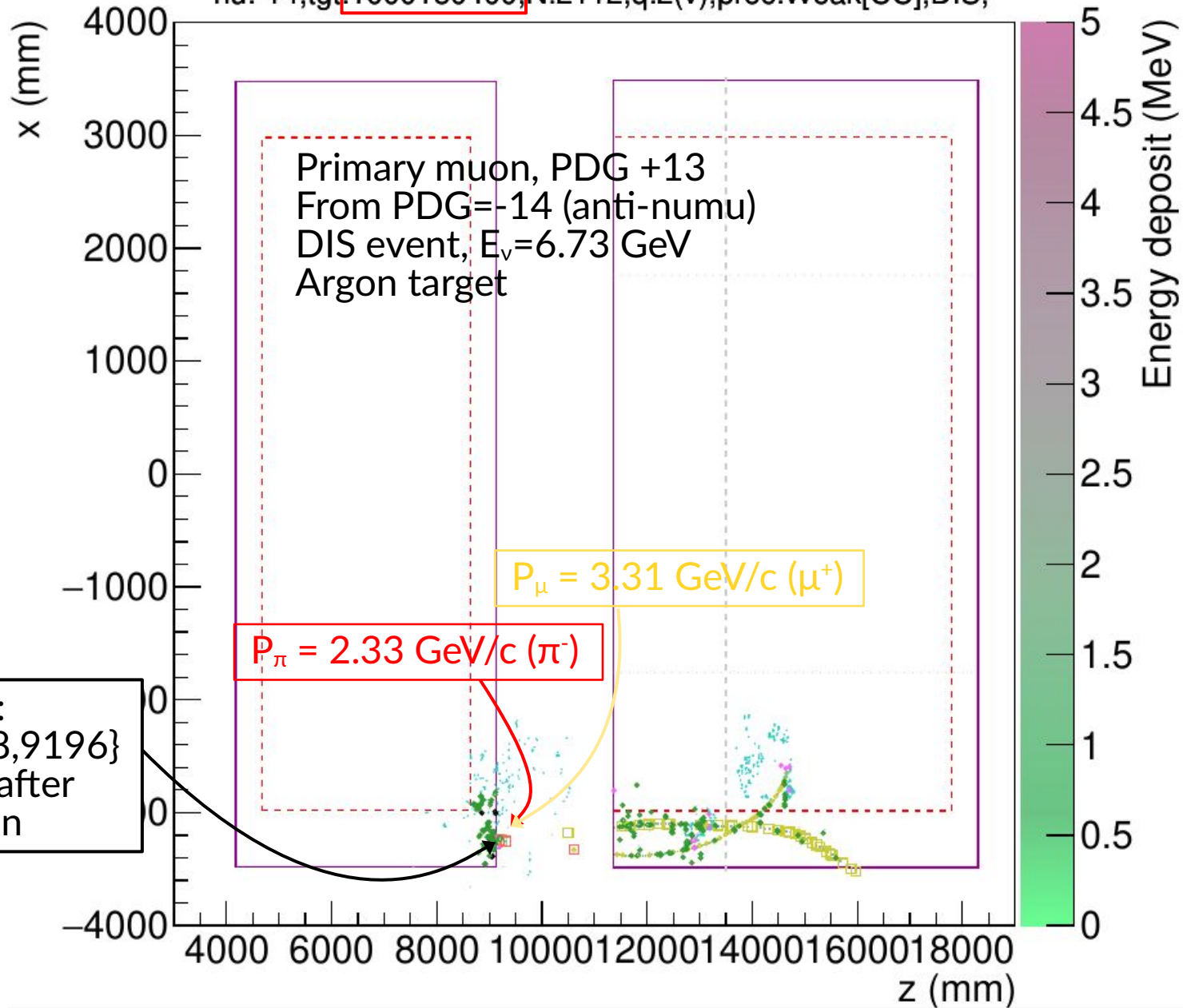nu:-14,tgt:1000180400,N:2112,q:2(v),proc:Weak[CC],DIS,

Primary muon, PDG +13
From PDG=-14 (anti-numu)
DIS event, E_ν=6.73 GeV
Argon target

True vertex:
{-3244,-648,9196}
In LAr, just after
active region

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$P_μ$ = 3.31 GeV/c ($μ^+$)

$P_π$ = 2.33 GeV/c ($π^-$)

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From PDG=-14 (anti-numu)
DIS event, E_ν=6.73 GeV
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P_μ = 3.31 GeV/c (μ^+)

P_π = 2.33 GeV/c (π^-)

μ^- end-point

π^-(2.23 GeV/c)
$\rightarrow\mu^-$(1.69 GeV/c)

μ^+ end-point

True vertex:
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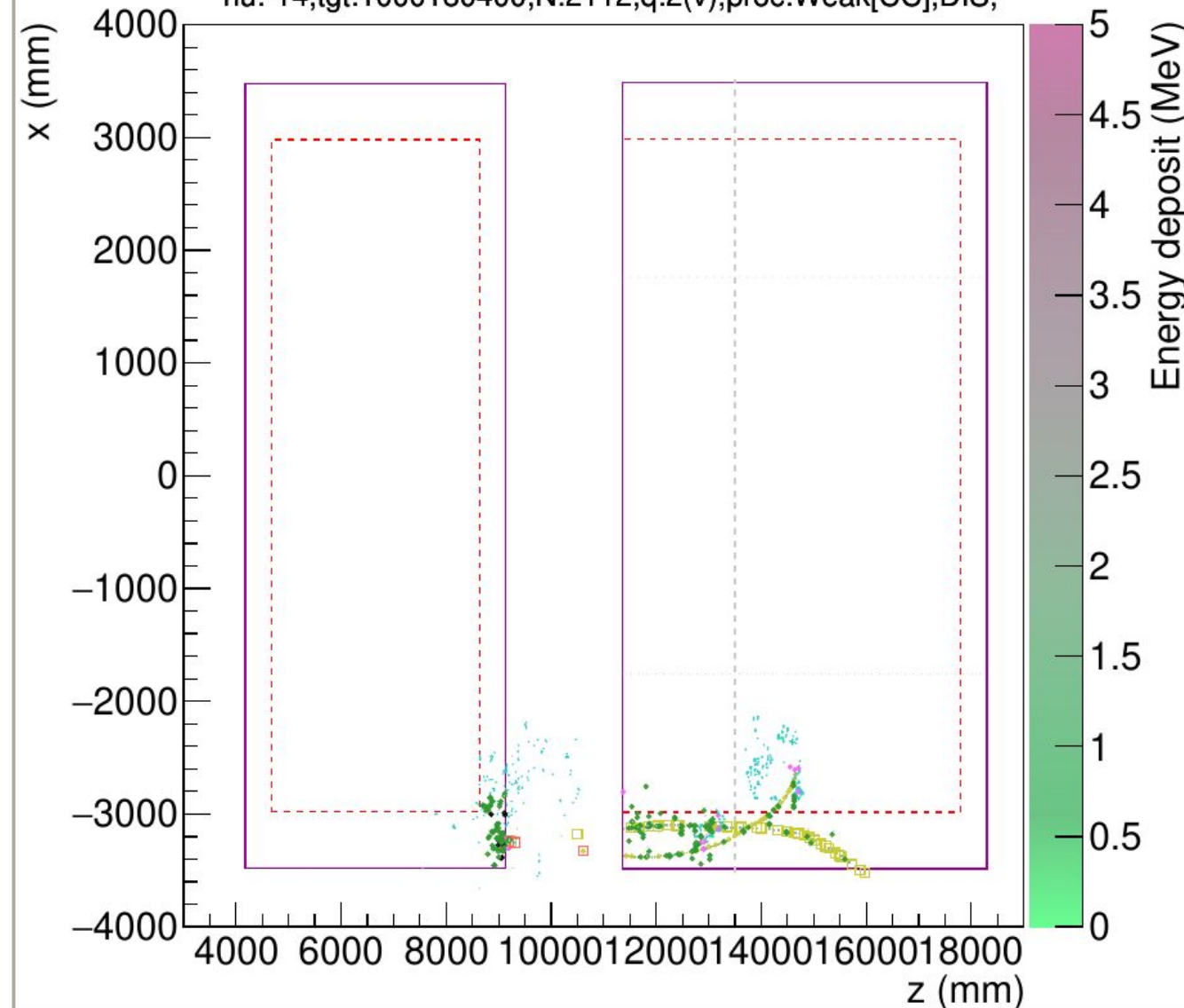In LAr, just after
active region
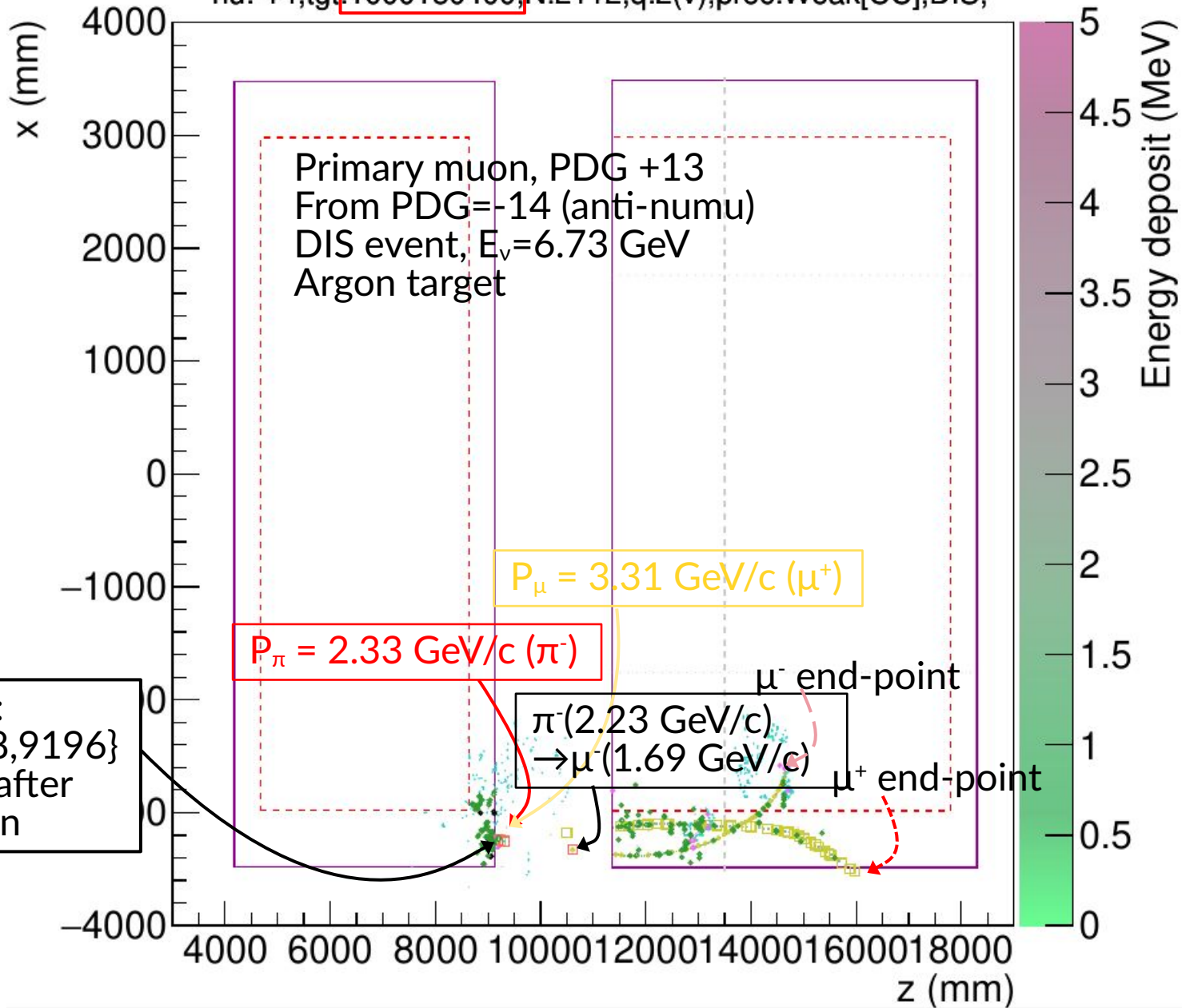
Introduction

Event 418, ν PDG: -14, E$_\nu$=6.73 GeV
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Tom was right!

Anti-numu DIS event, where a pi- decays in the dead region, creating a opposite-sign di-muon event as seen by the TMS

My guess is it would be selected as mu+pi?

But which is mu, which is pi? I think this guess determines if classified as a numu or anti-numu interaction

This event wouldn't enter selection though, **since no LAr vertex!**