

FGT Display, Mock Reconstruction, Analysis

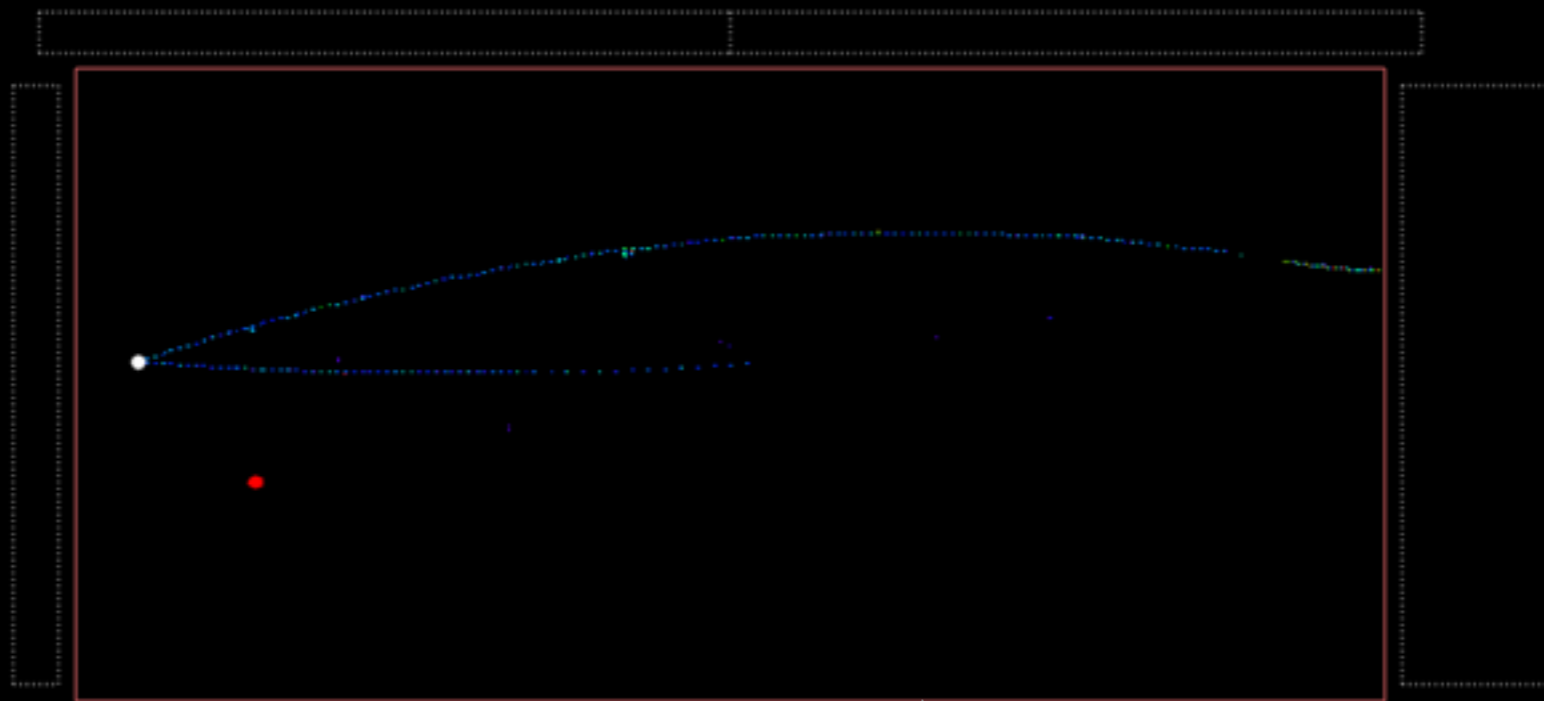
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Event Display

- Simulated depositions: xz & yz projections colored by charge (by time on its way)
- Vertex is a white dot
- MuonID hits are red dots
- Detector draw levels: STT, ECAL, MuonID
- Following events are single-neutrino GENIE events

yz view

ν_μ -CC (DIS)
3.893 GeV



B

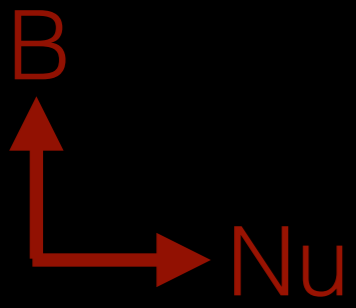
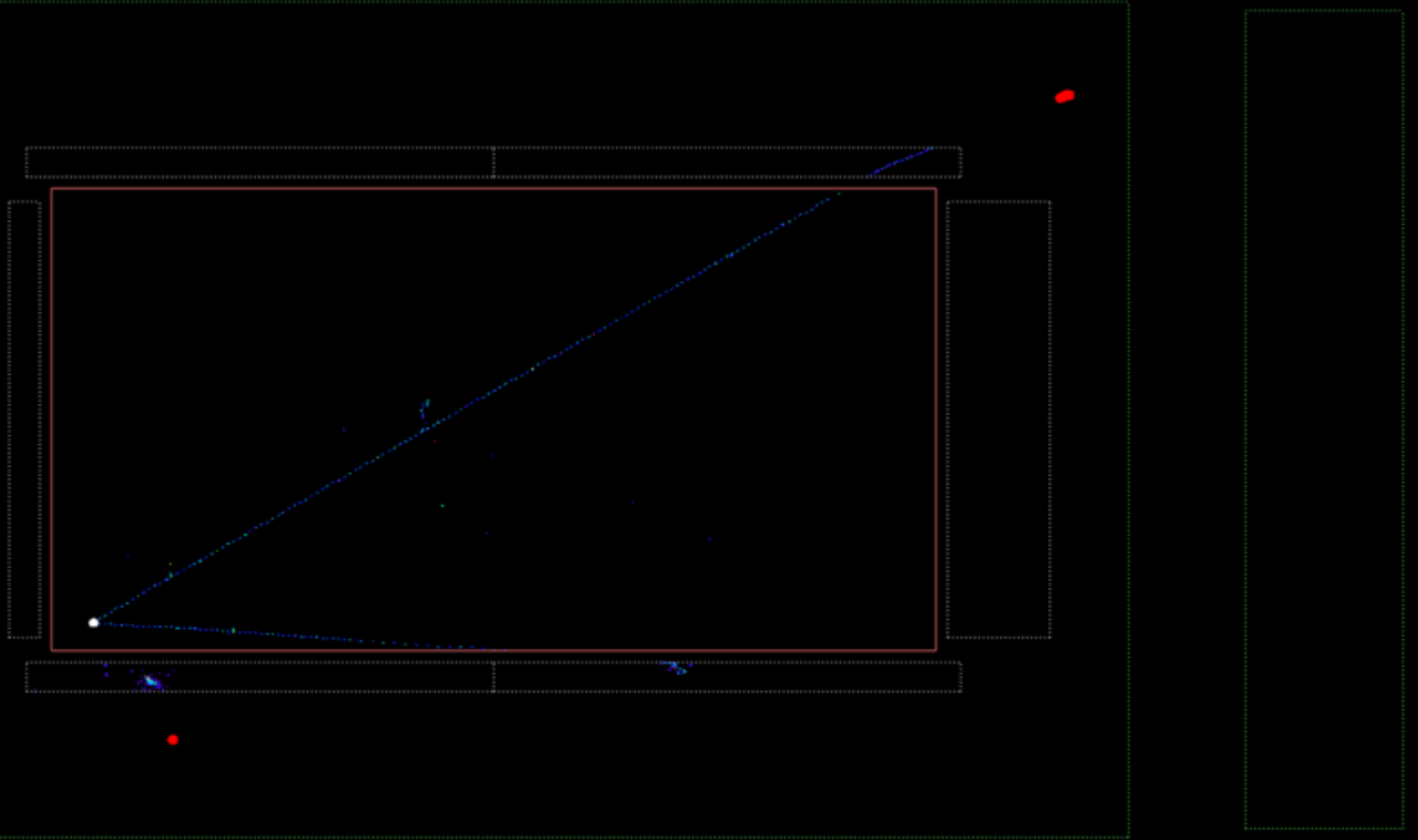
into page

X → Nu

MuID, ECAL, and STT boundaries

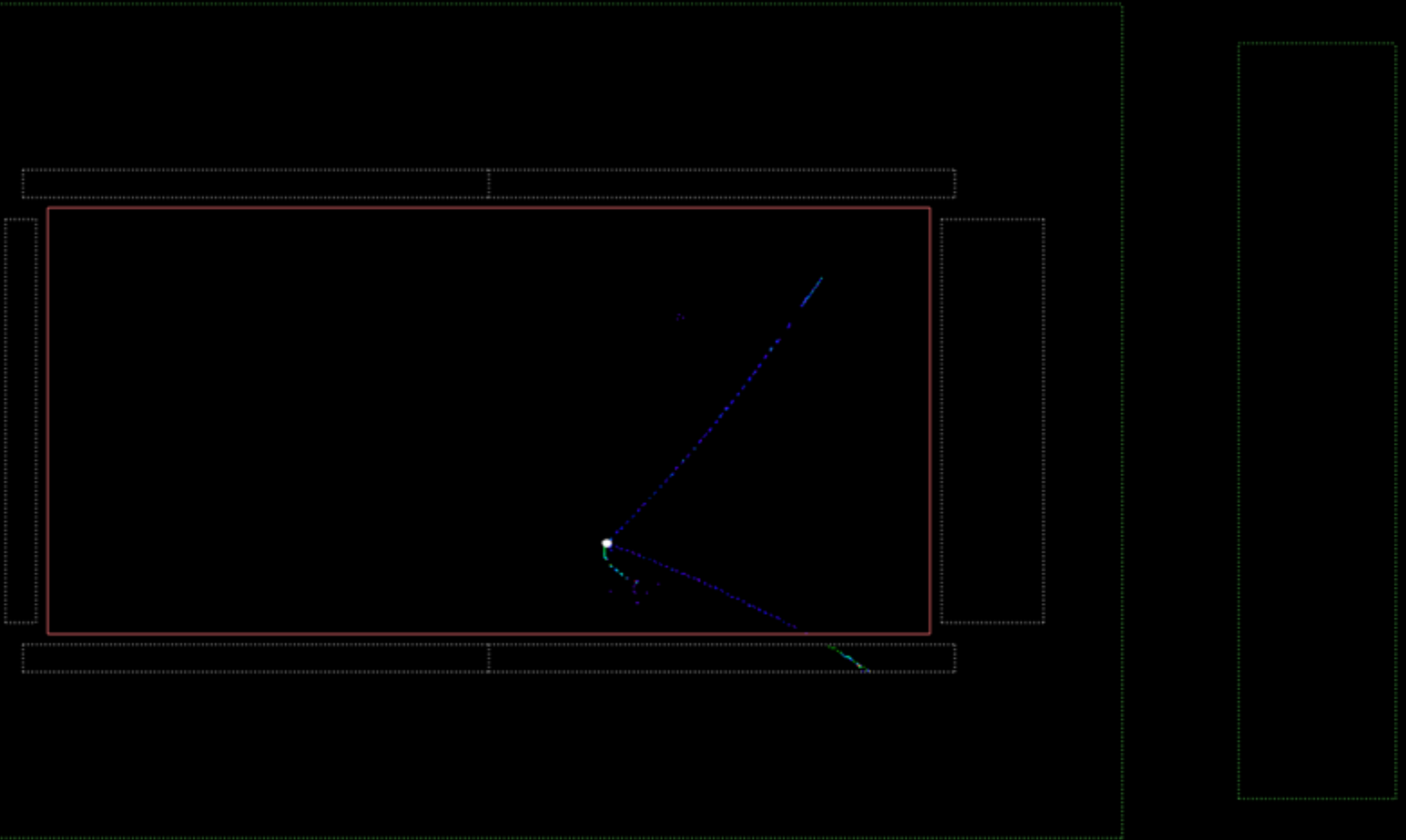
xz view

ν_{μ} -CC (DIS)
3.893 GeV



yz view

ν_{μ} -CC (Res)
2.598 GeV



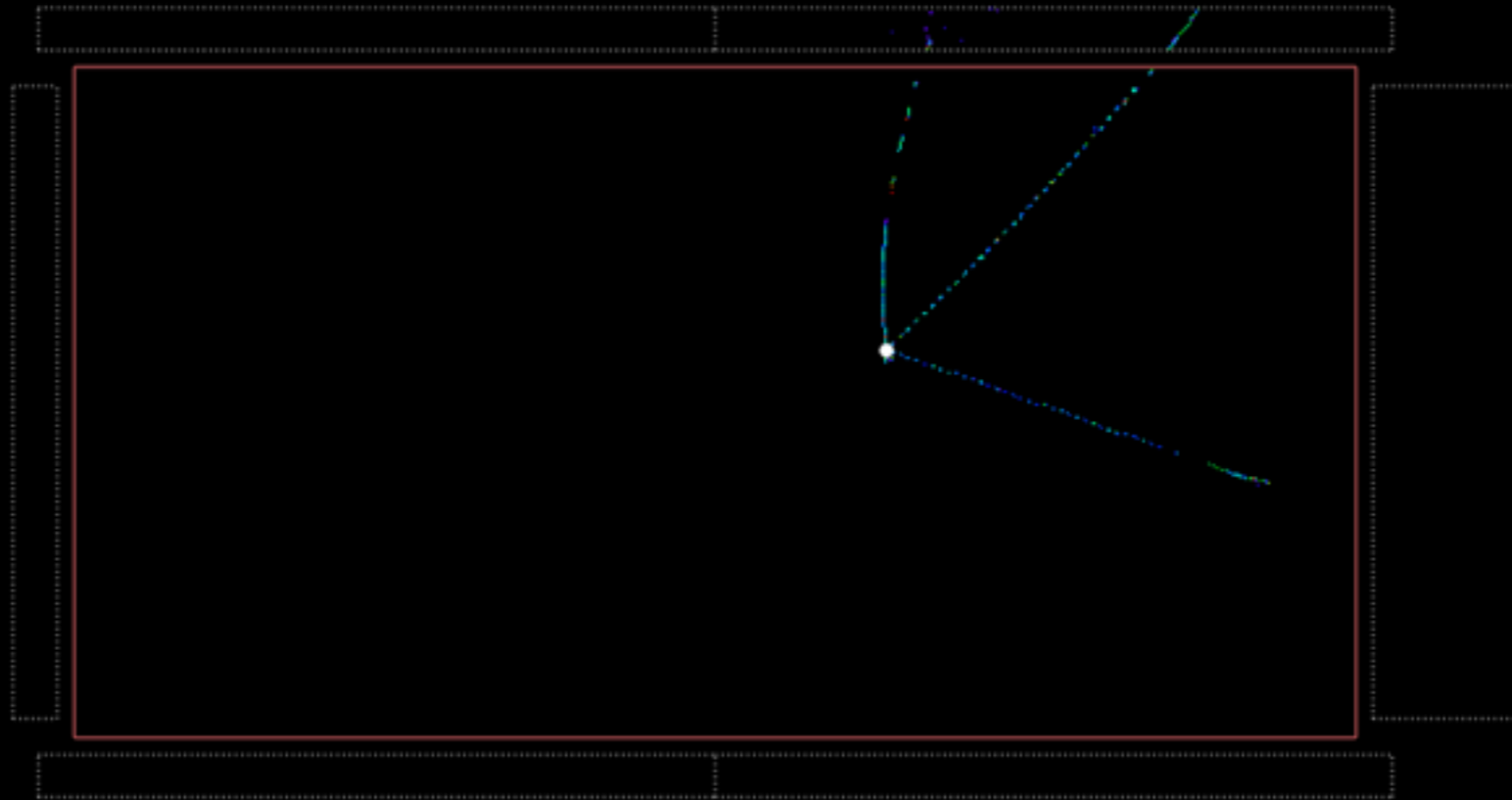
B

into page

X → Nu

xz view

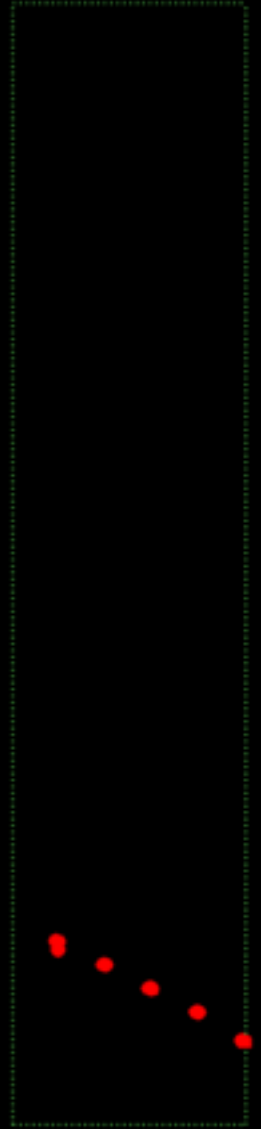
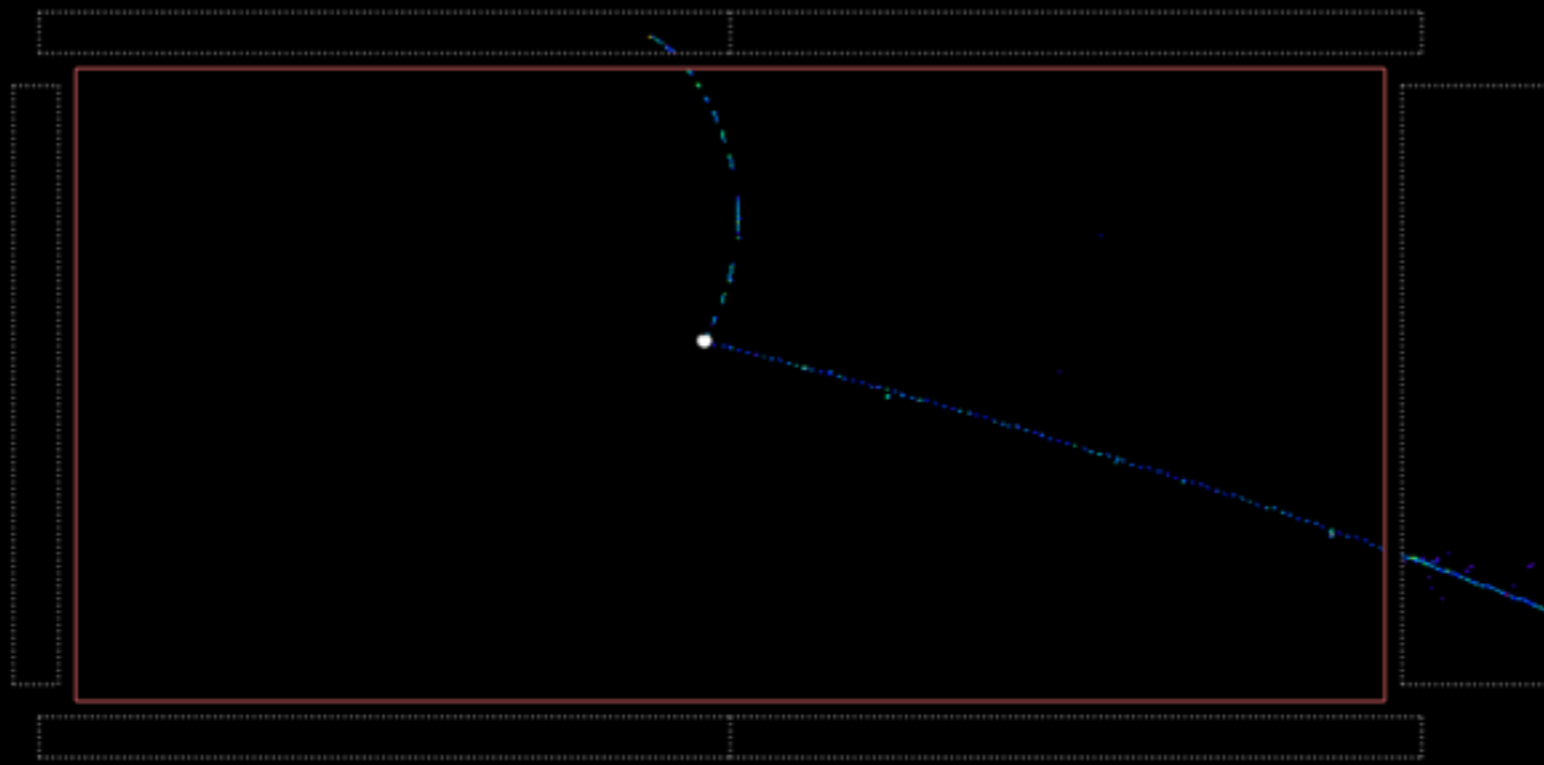
ν_{μ} -CC (Res)
2.598 GeV



B
Nu

yz view

ν_{μ} -CC (DIS)
4.481 GeV

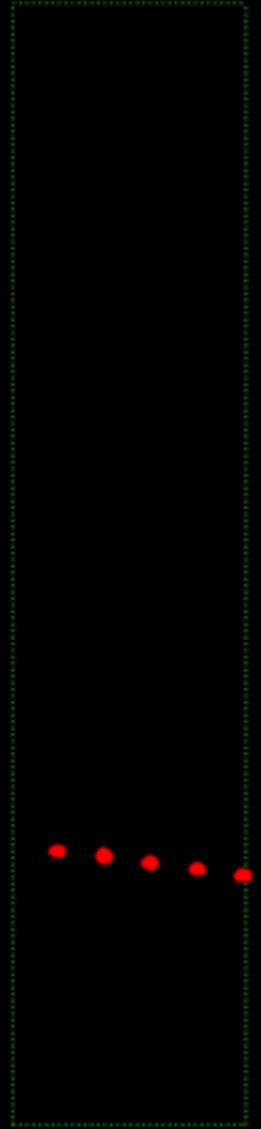
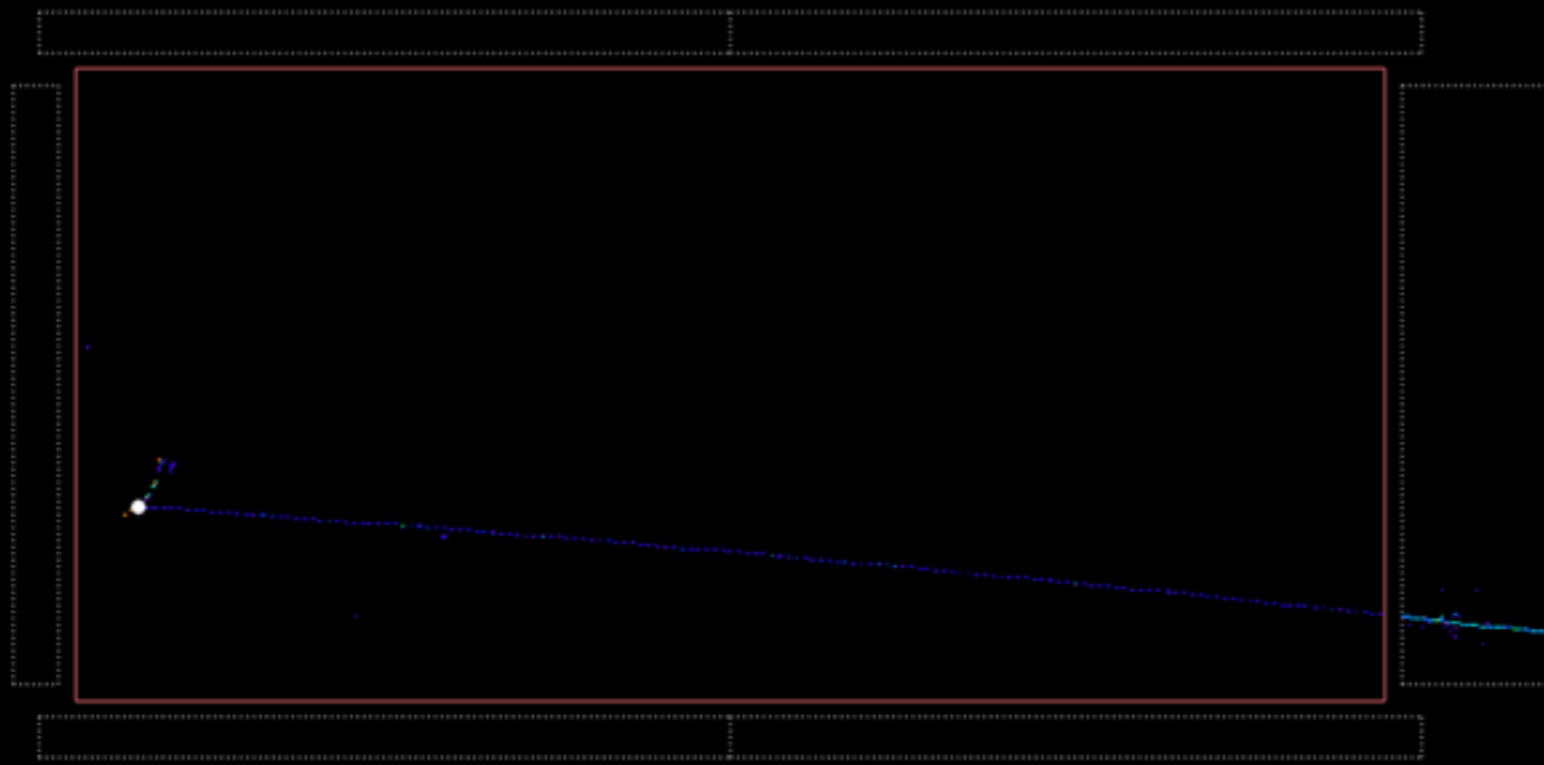


B

X → Nu

yz view

ν_{μ} -CC (Res)
14.198 GeV

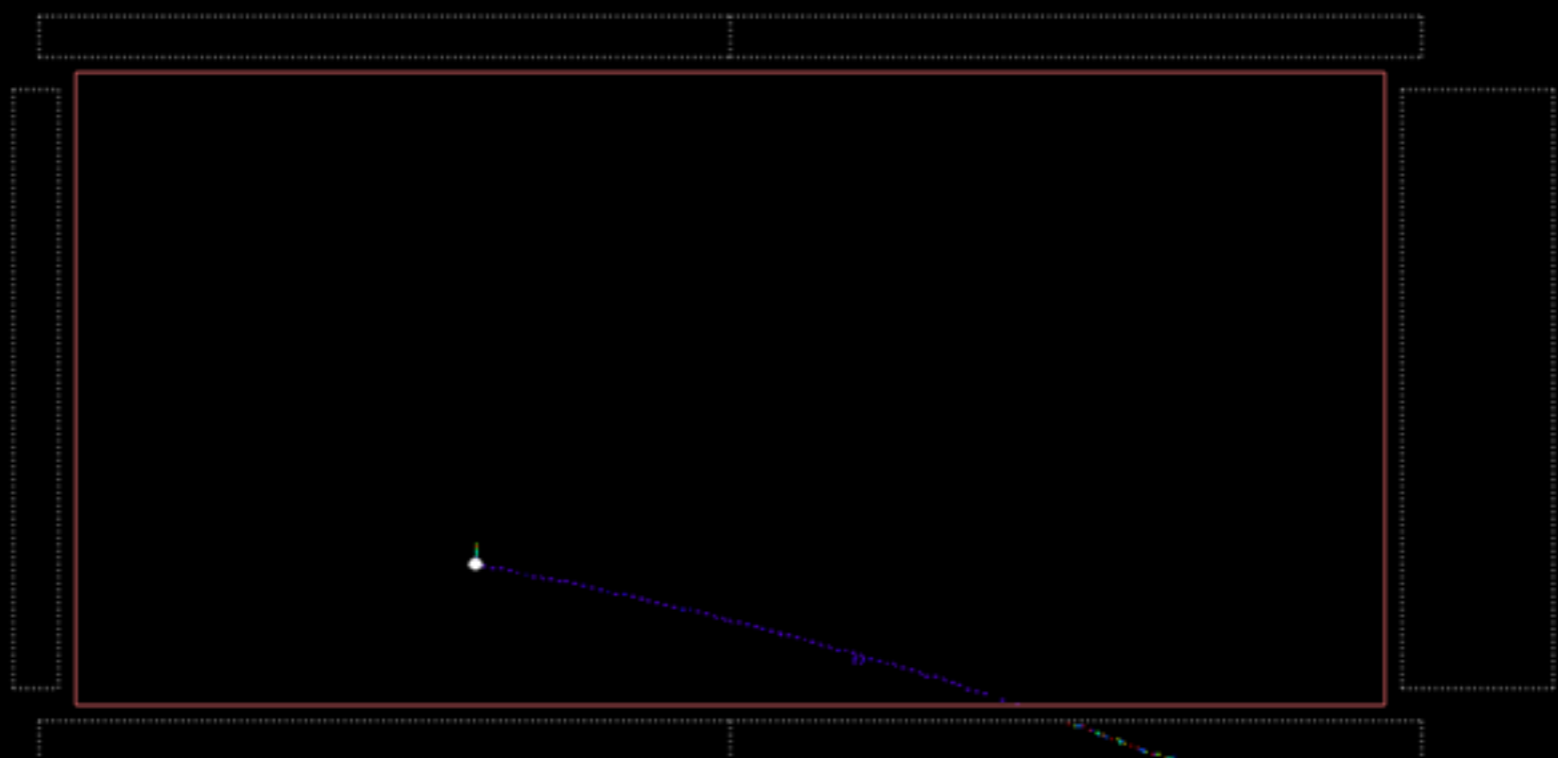


B

X → Nu

yz view

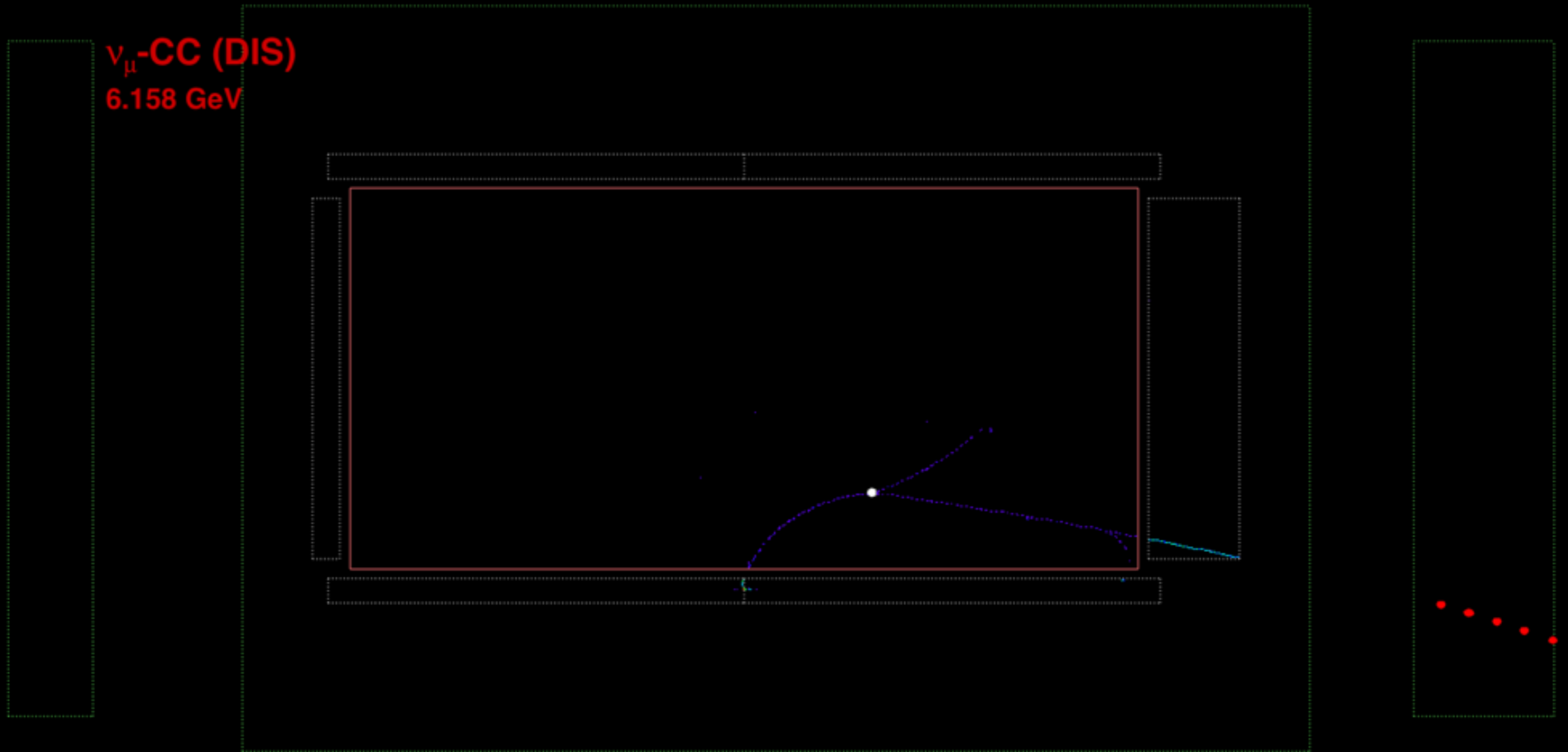
ν_{μ} -CC (QE/EI)
2.353 GeV



B

X → Nu

yz view

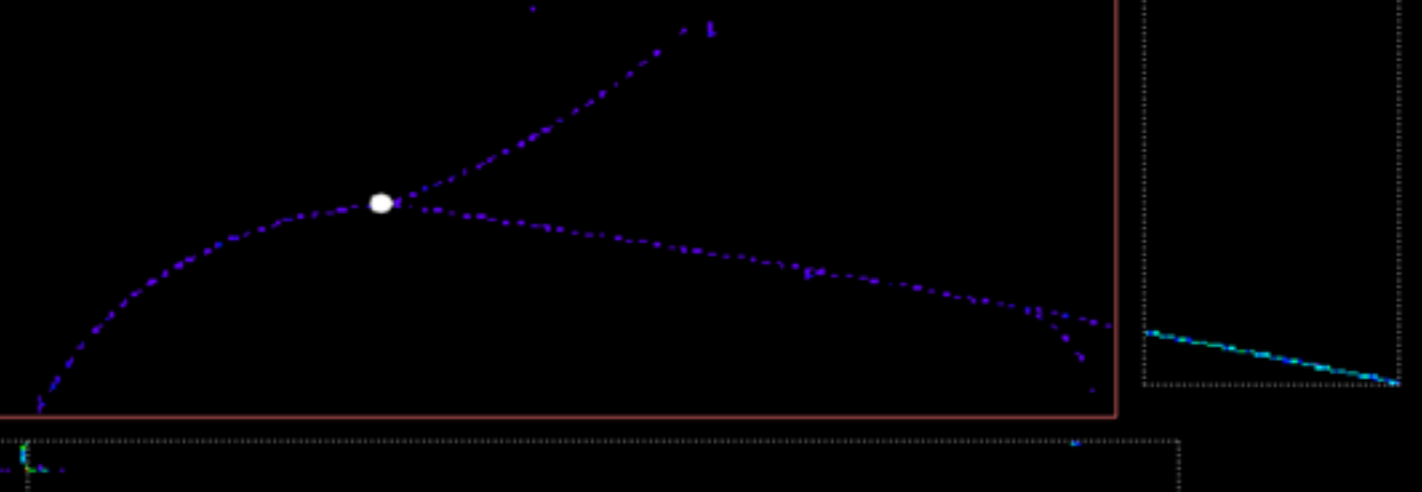


B

X → Nu

yz view, ECAL draw level

ν_{μ} -CC (DIS)
6.158 GeV



B

X → Nu

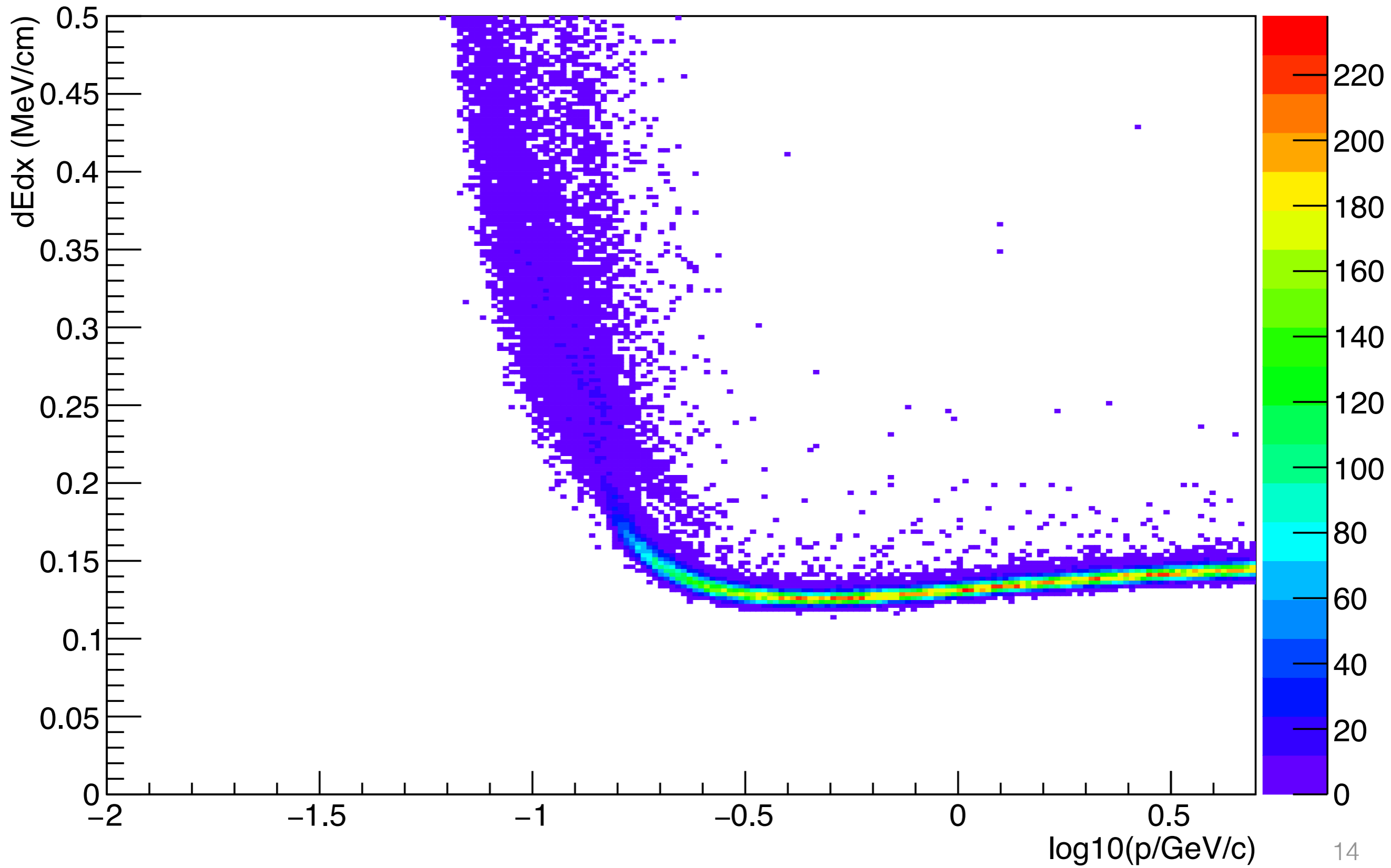
Event Display

- Very fast
- More features on the way
- Track reconstruction display
- Color coding by time, by particle type
- Raw display “mimic”
- Selection filters

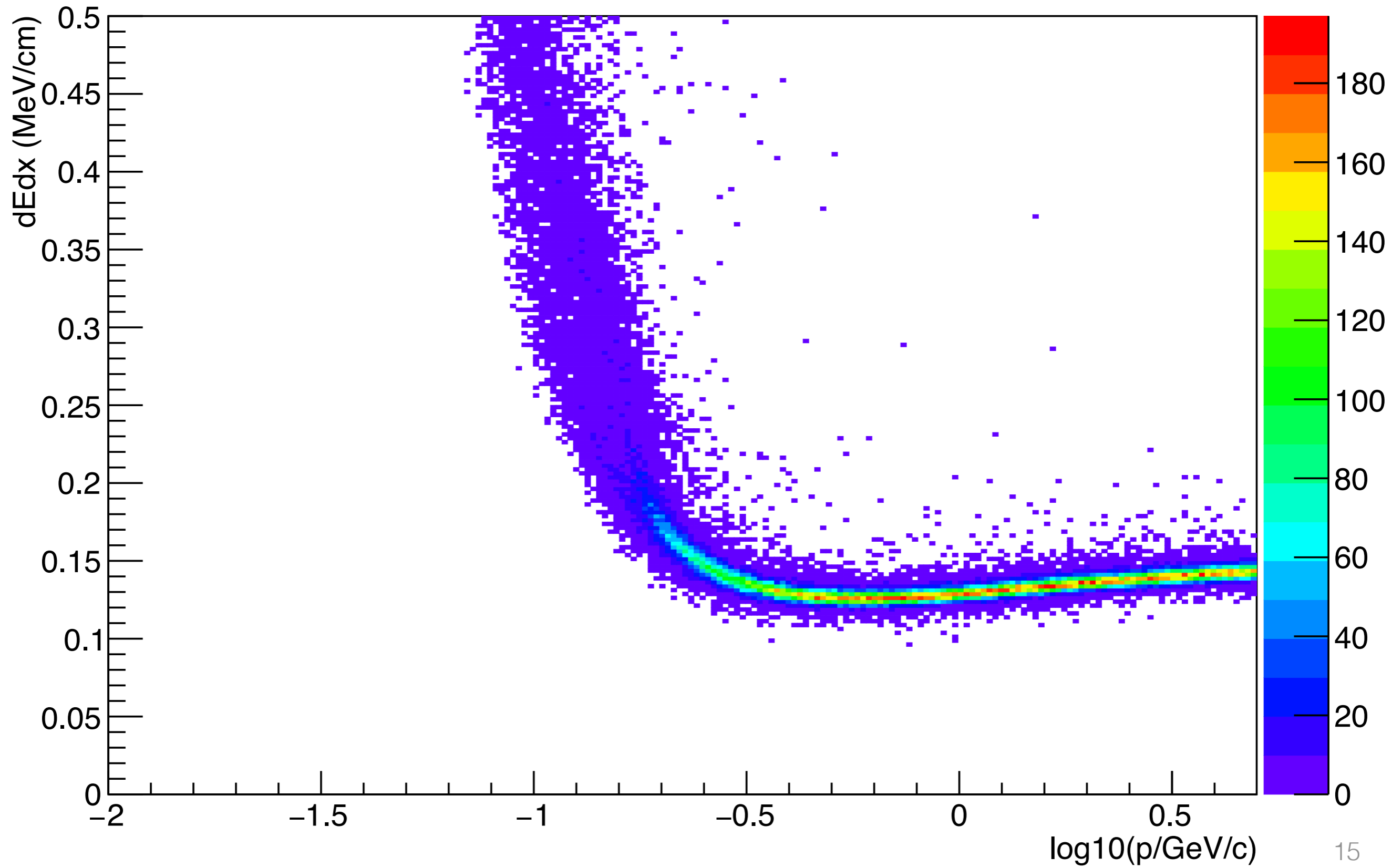
$dE dx$ vs $\log p$

- Simulation level, or with dE smeared by 1%
- 100k single particle events per plot
- x-axis is actually $\log_{10}(p)$ in constant linear bins
- higher statistic at lower p , constant statistics per $\log_{10}(p)$ bin
- There are wider-range versions which will be used as lookups for a PID-likelihood method
- Momentum is still just true momentum
- Both dE and p will be smeared based off of NOMAD experience, once I find the proper references

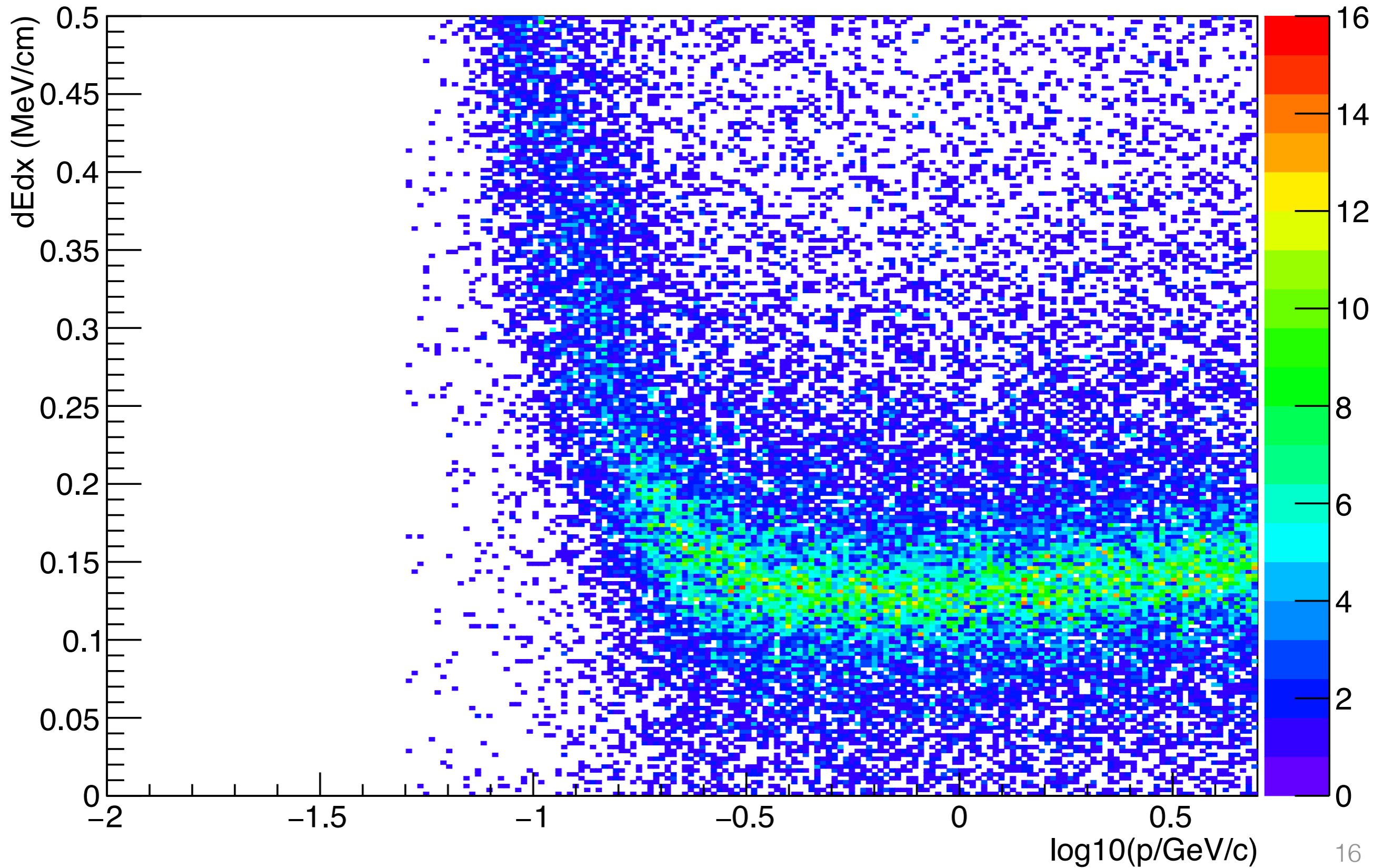
Muons



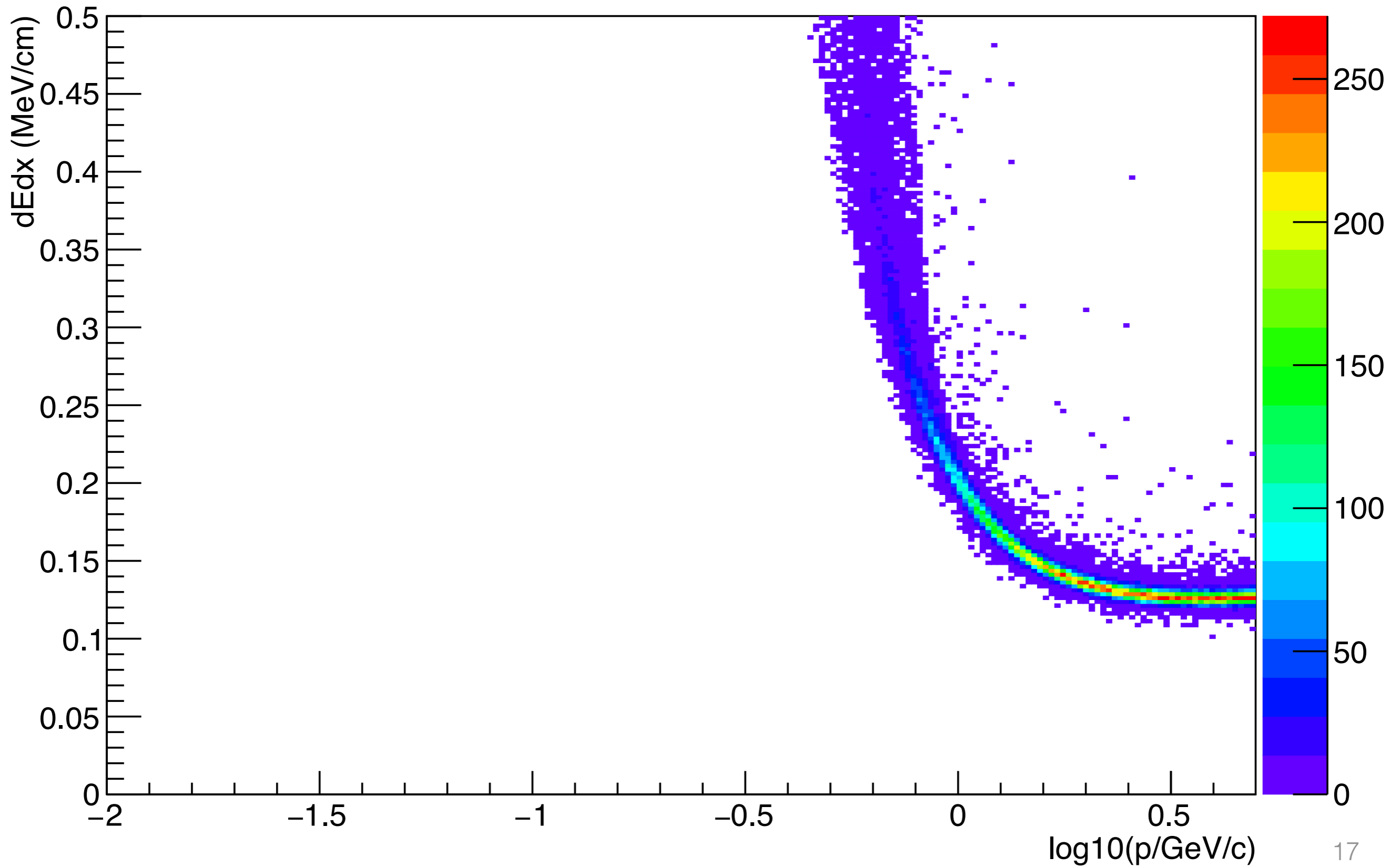
Pions



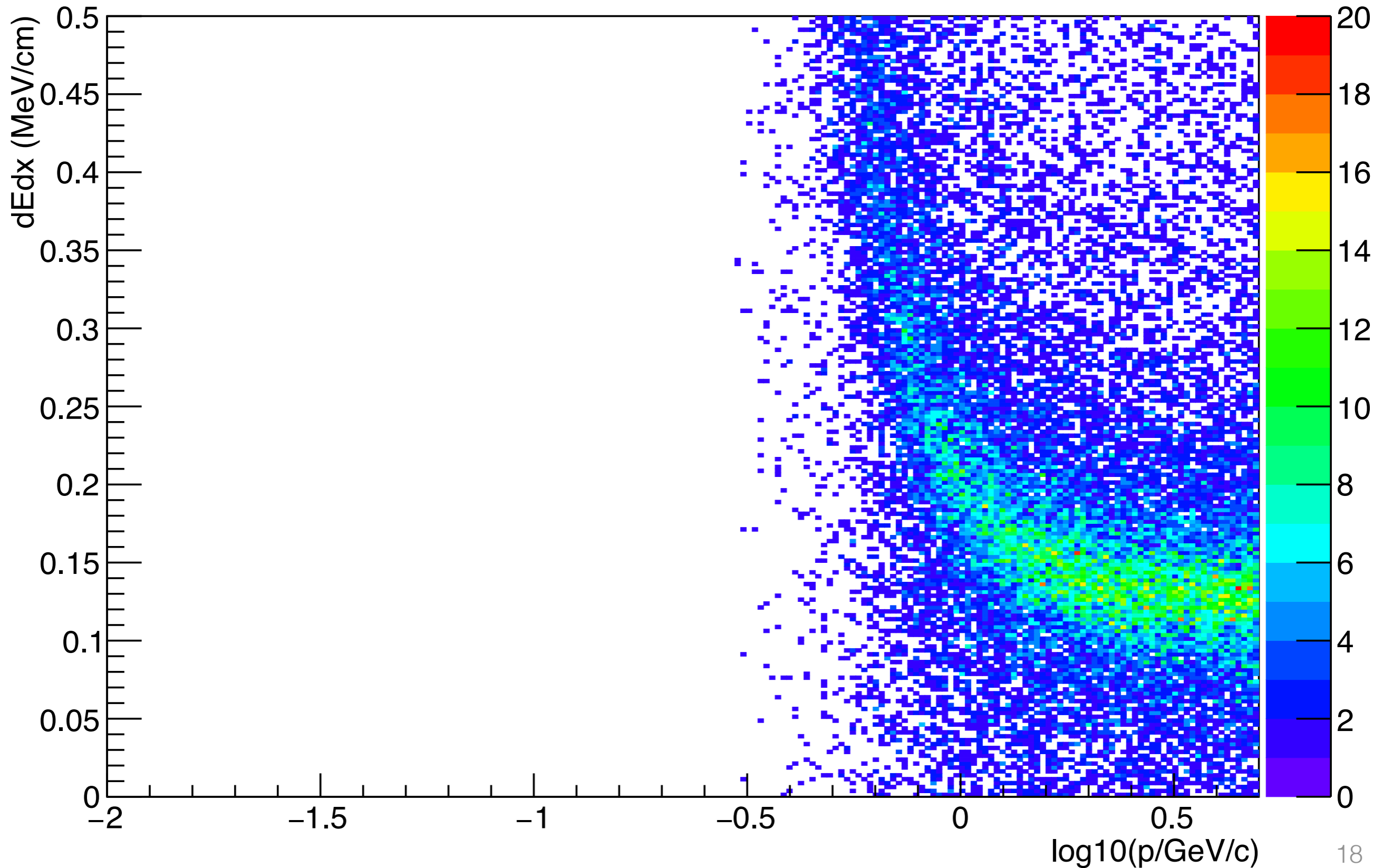
Pions, dE smeared 1%



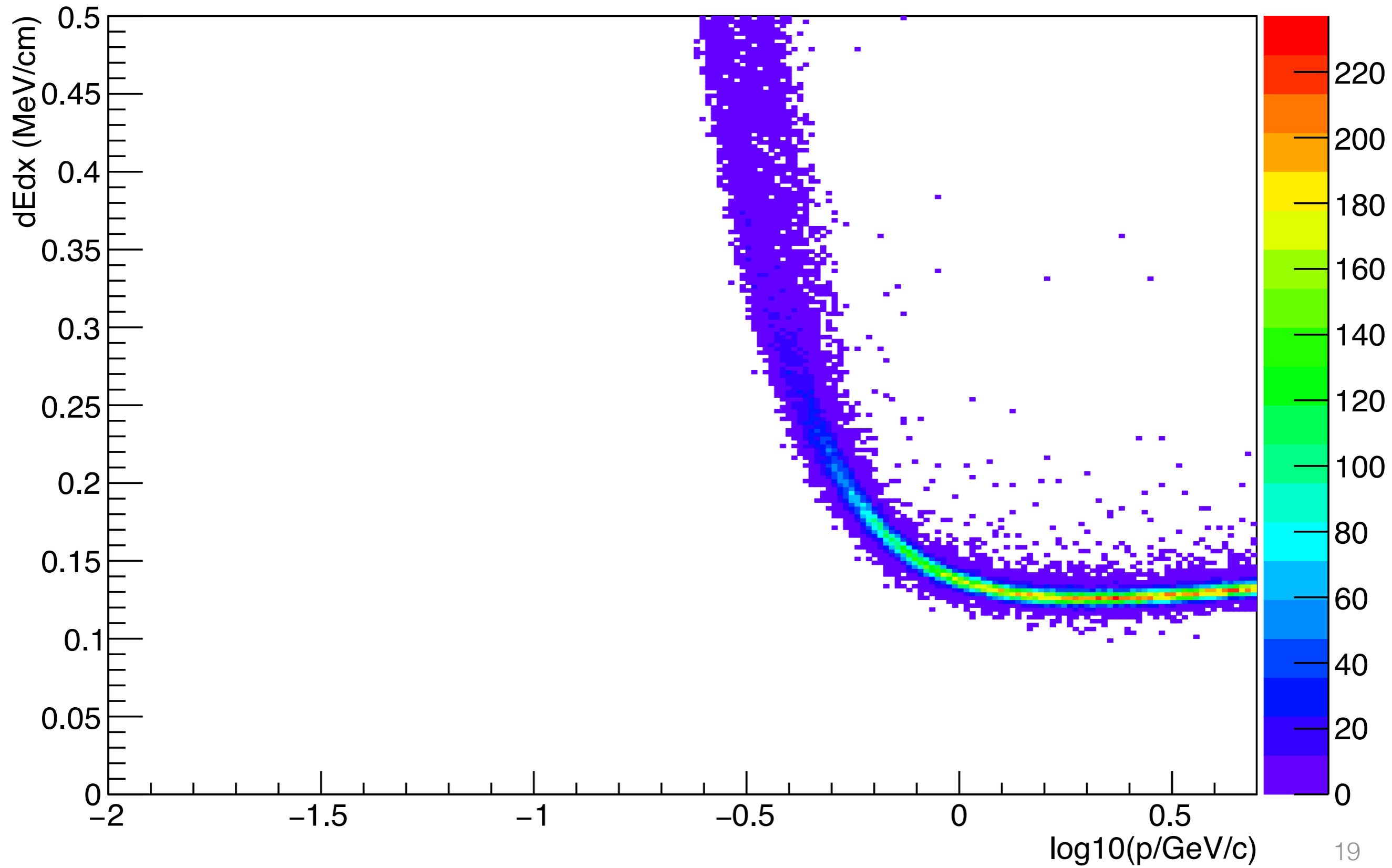
Protons



Protons, dE smeared 1%



Kaons



Second Run-through

- Tracks cheated from g4 depositions, smeared on xyz, dE
- Showers cheated, smeared on angle and total E
- Primitive PID:
 - dEdx PID-likelihood
 - Fitting ECAL tracks/showers to tracks in STT
 - Fitting MuonID hits to tracks in STT
- shooting for a missing pT cut
- Using PID + cheated vertices to classify into valor samples

Second Run-through

Which involves cheating....

- Momentum reconstruction (Kalman filter not ready)
- Vertices
- ECAL track vs. shower discriminant
- Clustering



Questions?