

First look at dE/dx

Datasets with solenoid at 1200 A:

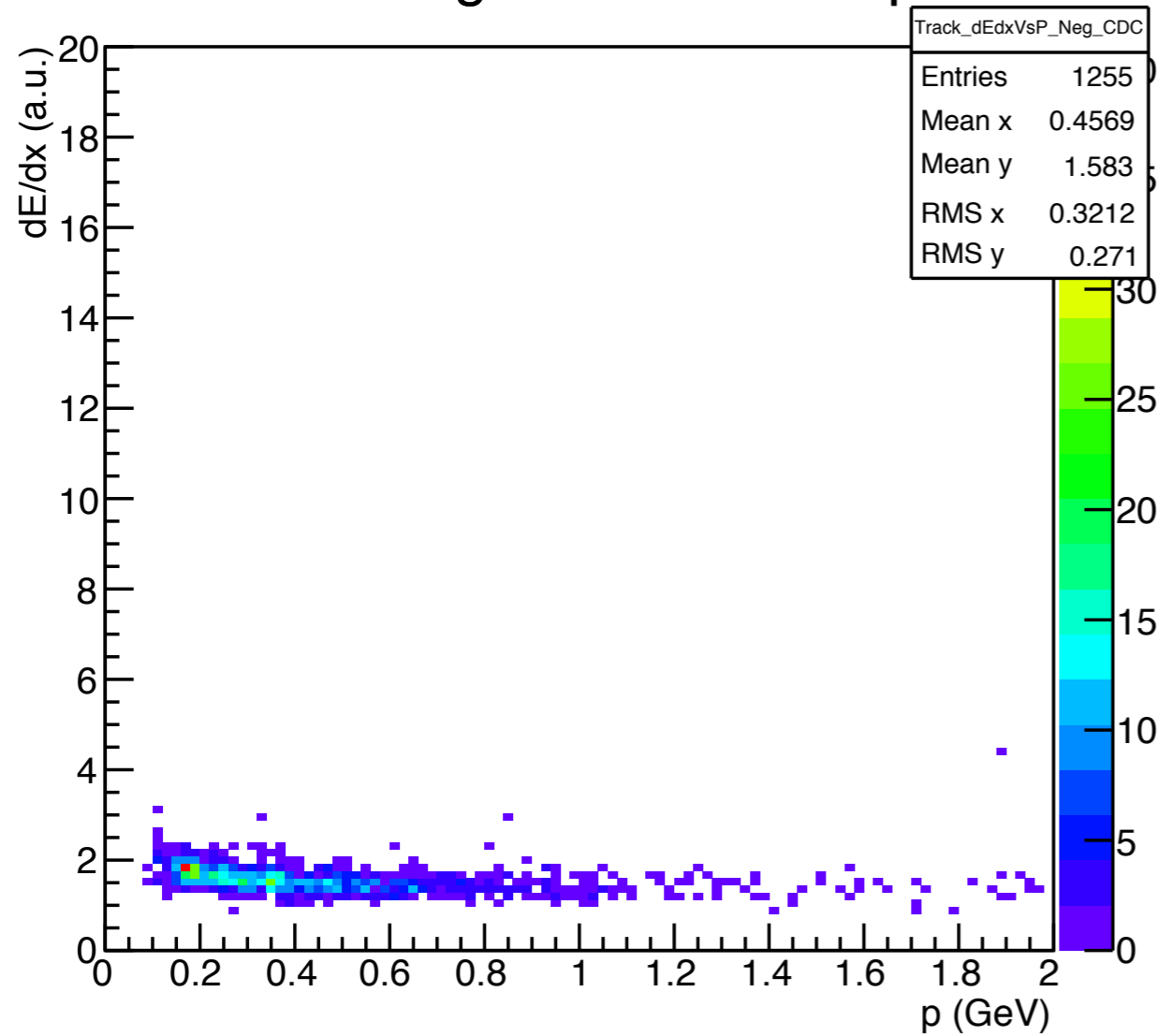
- ~5 M events with **FCAL trigger**: runs 1505-1514
- ~5 M events with **BCAL trigger**: runs 1553-1558

Track Selection

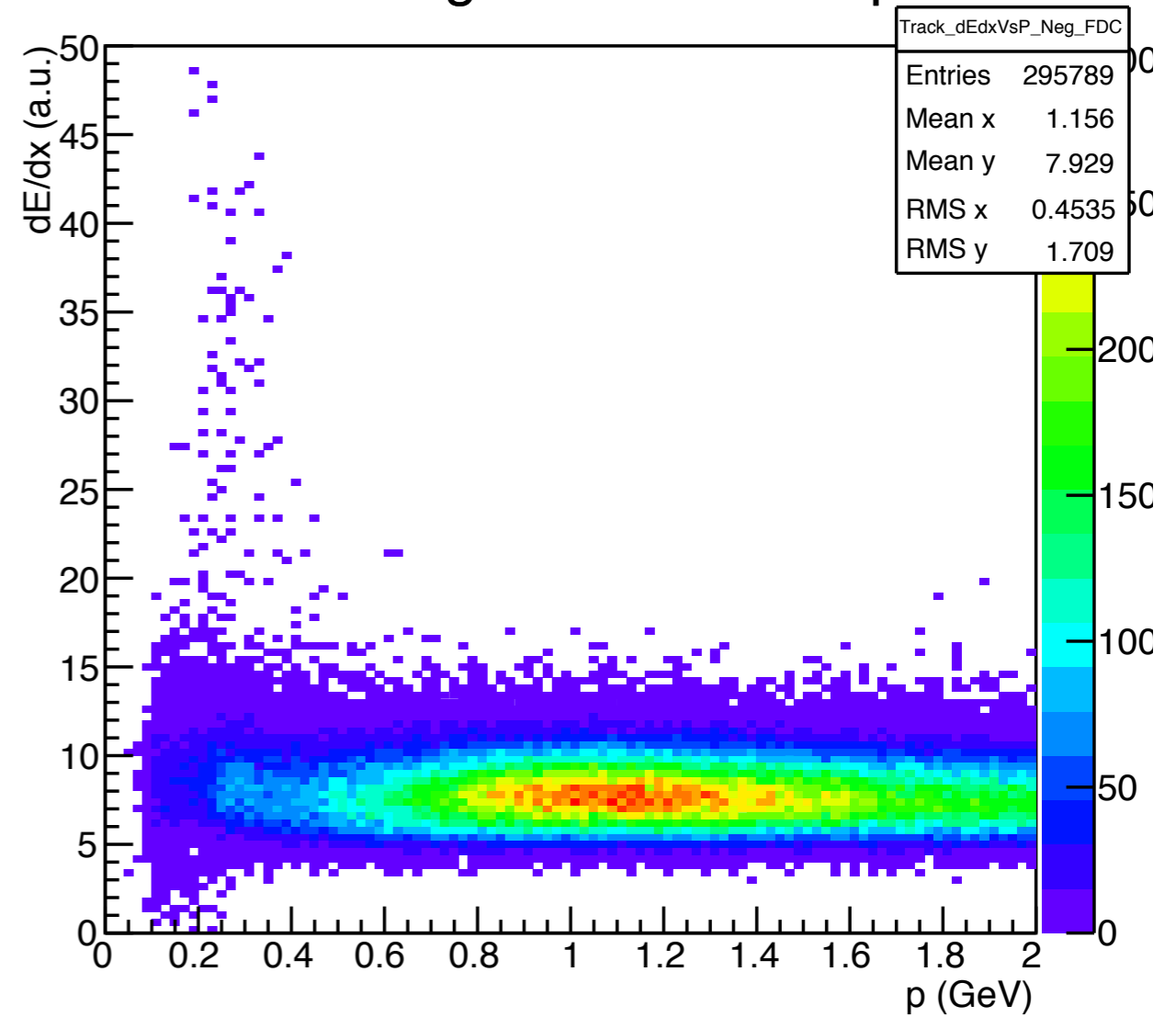
- Use DTrackTimeBased tracks with only the pion mass hypothesis and require:
 - Tracking FOM $> 10^{-3}$
 - POCA to beamline: $50 < Z < 80$ cm
 - `dNumHitsUsedFordEdx_CDC` or `FDC` > 5

Data: Negative Tracks dE/dx vs p

CDC Negative: dE/dx vs p



FDC Negative: dE/dx vs p

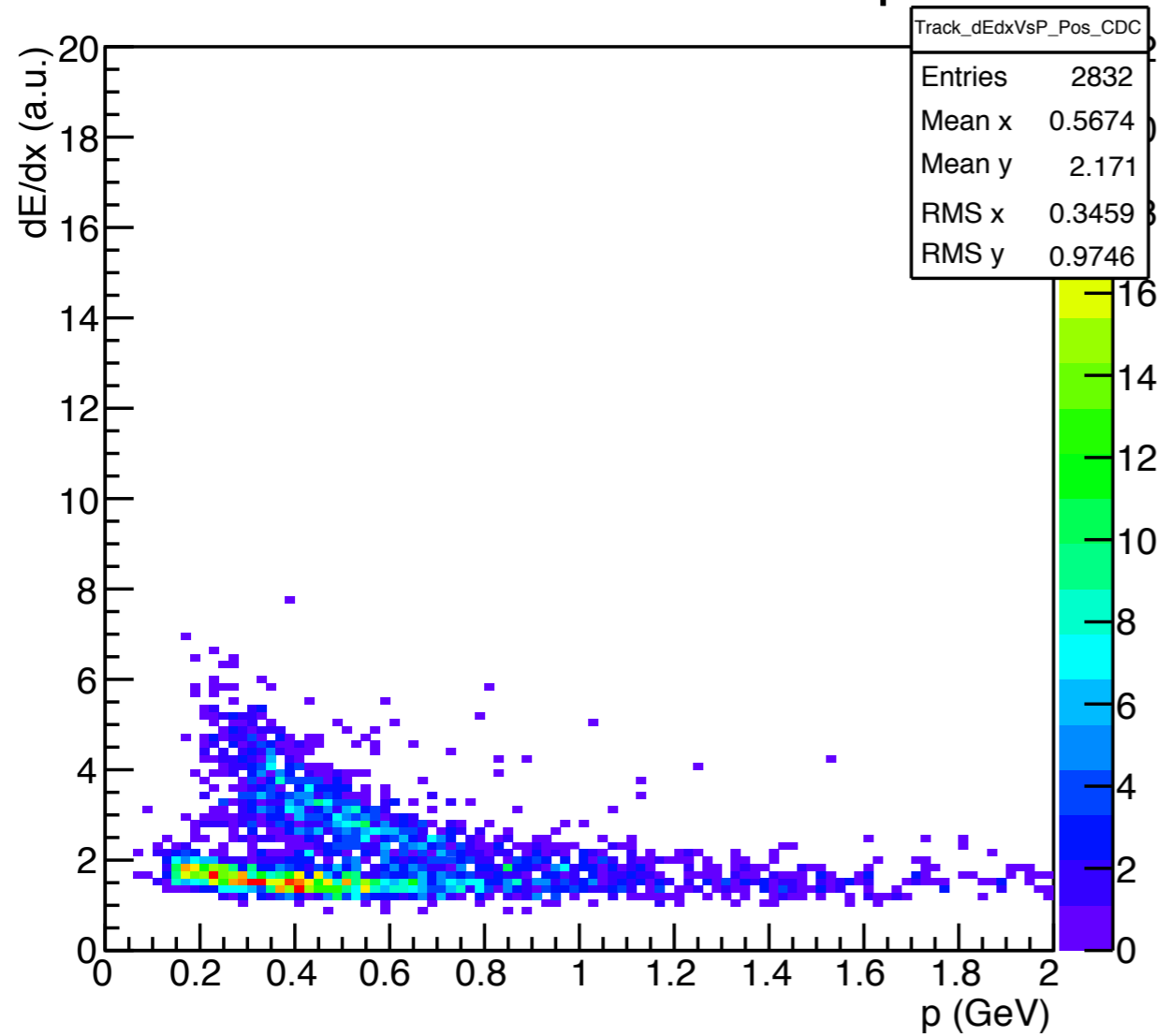


Single dE/dx band

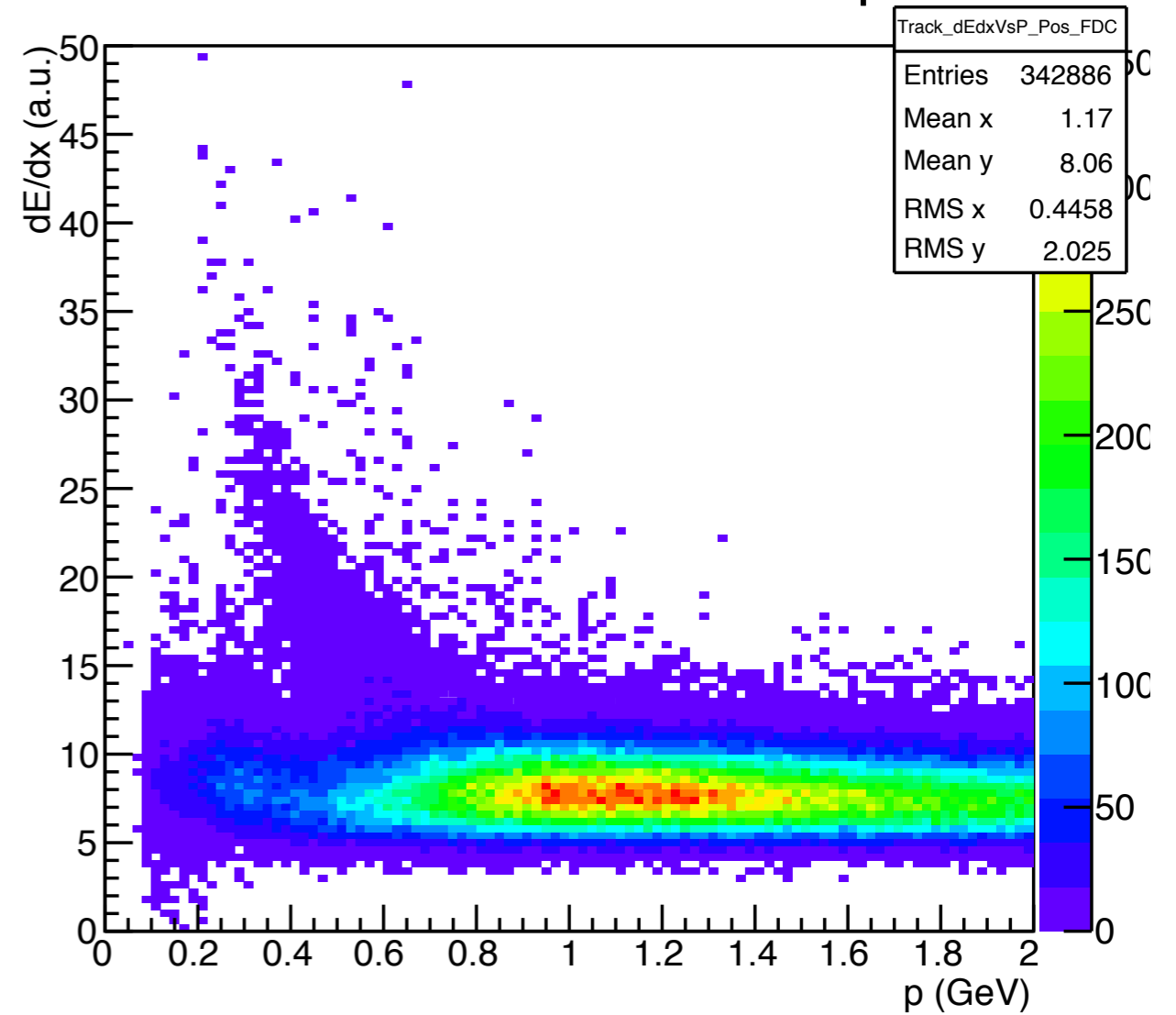
FCAL trigger: runs 1505, 1506, 1513, and 1514

Data: Positive Tracks: dE/dx vs p

CDC Positive: dE/dx vs p



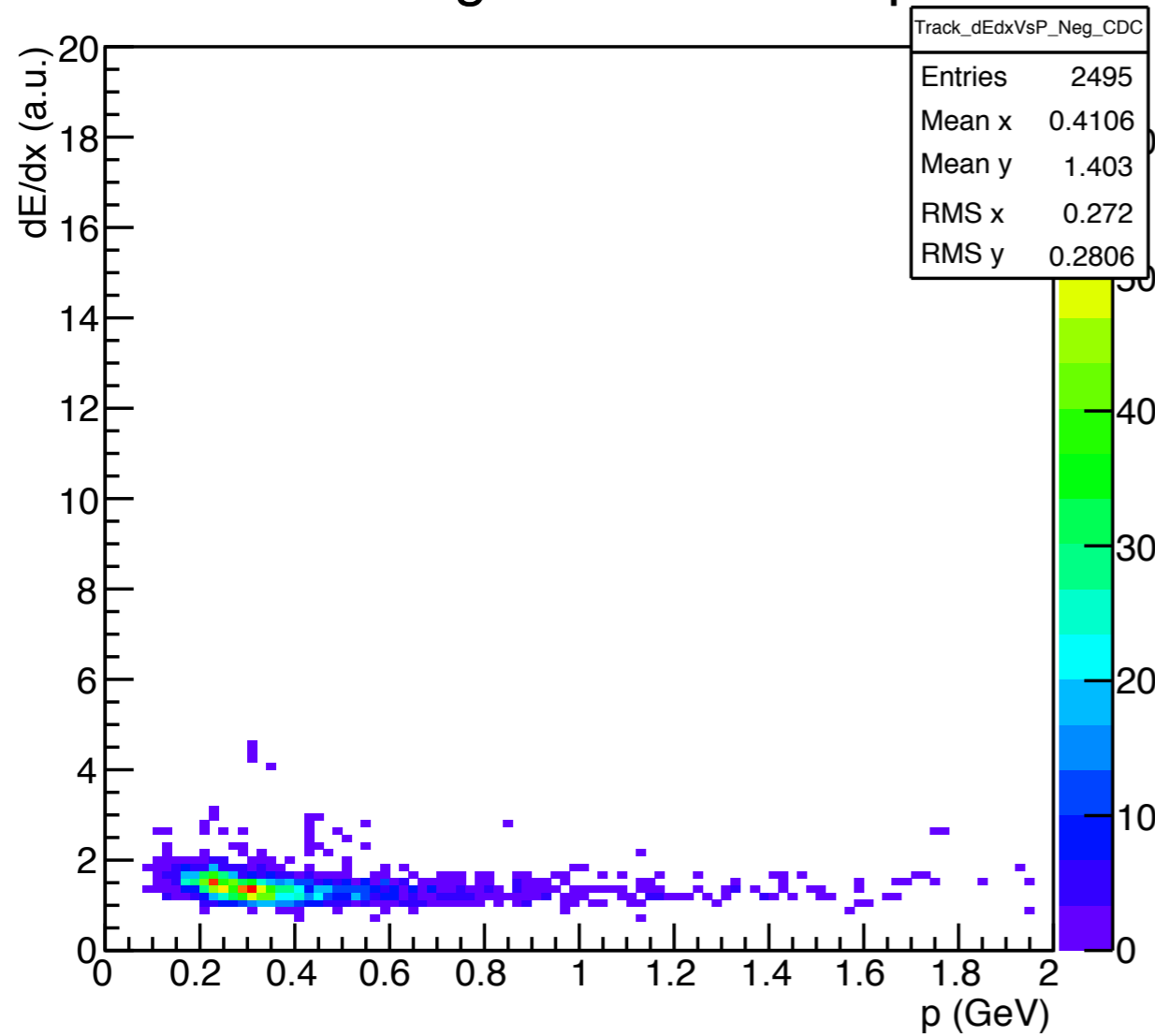
FDC Positive: dE/dx vs p



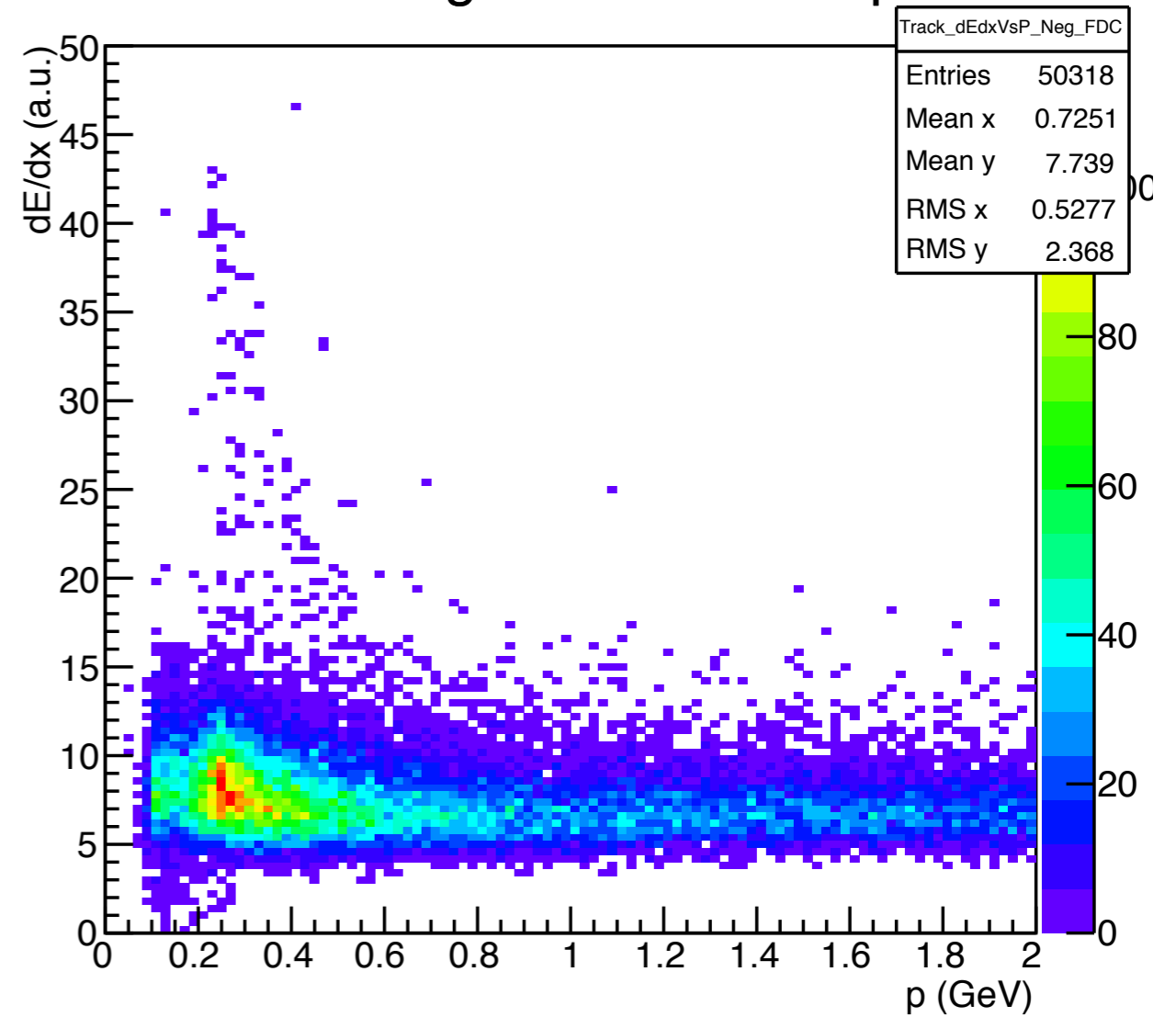
FCAL trigger: runs 1505, 1506, 1513, and 1514

Data: Negative Tracks dE/dx vs p

CDC Negative: dE/dx vs p



FDC Negative: dE/dx vs p

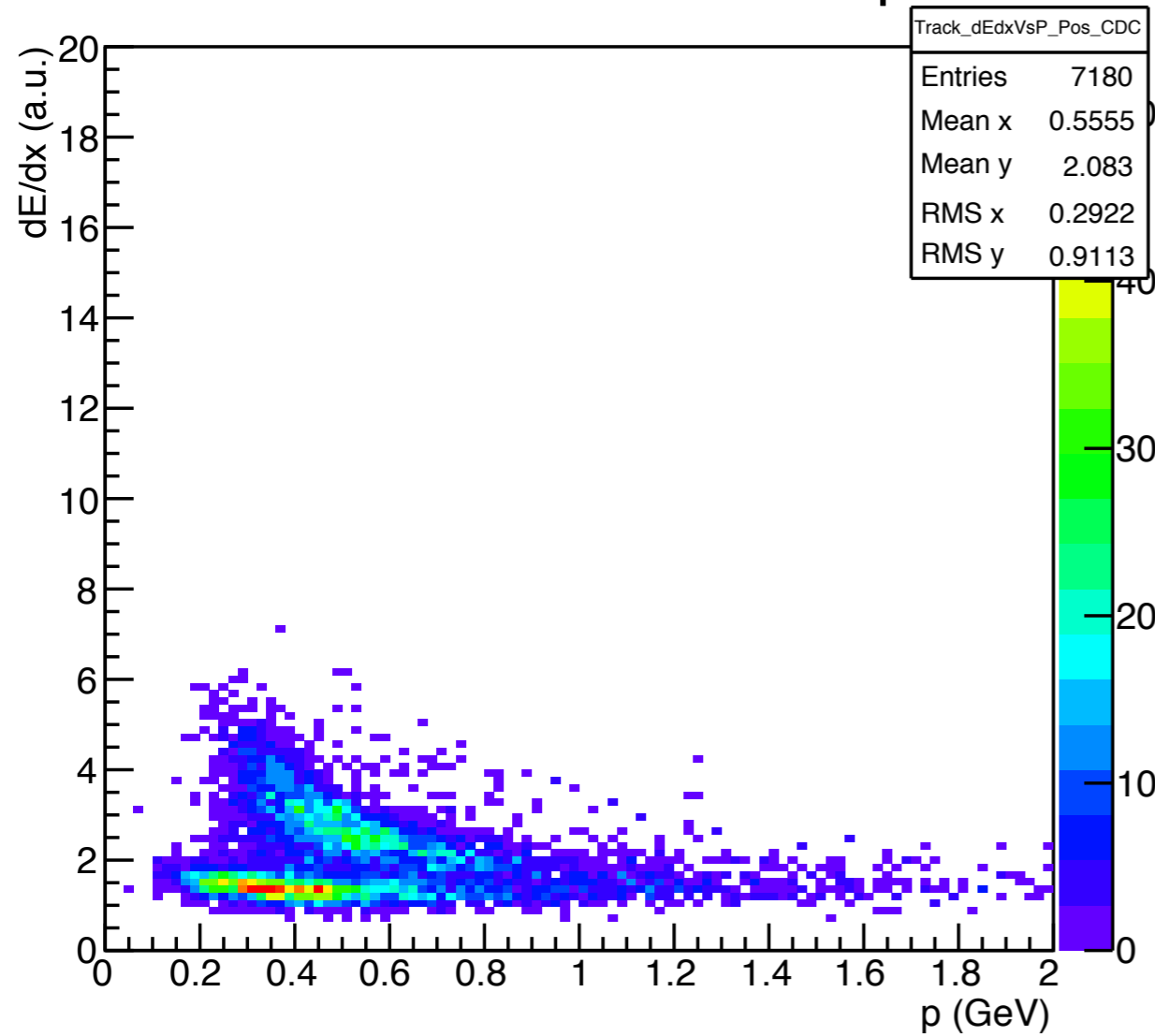


Single dE/dx band

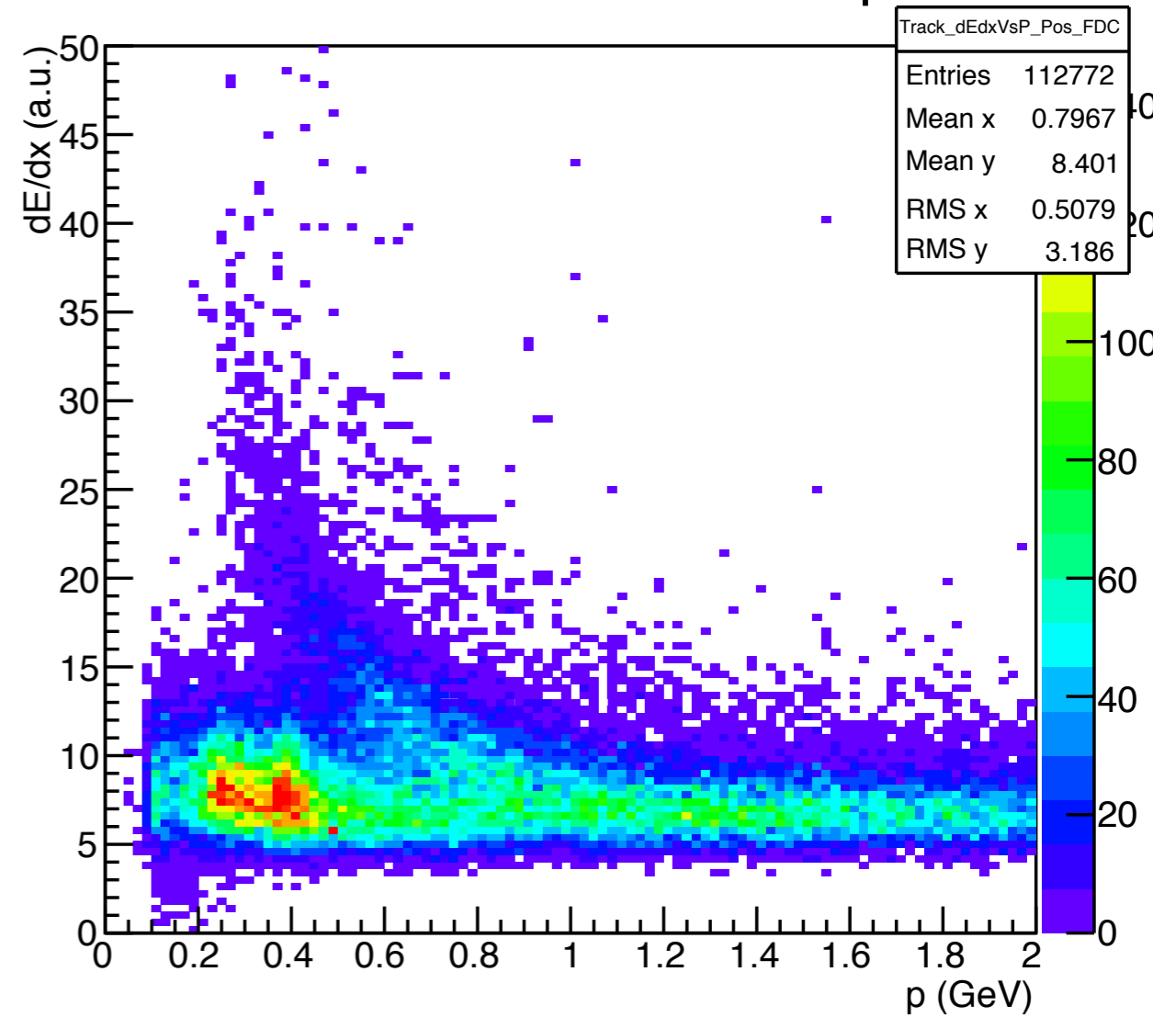
BCAL trigger: runs 1553, 1556, 1557, and 1558

Data: Positive Tracks: dE/dx vs p

CDC Positive: dE/dx vs p



FDC Positive: dE/dx vs p



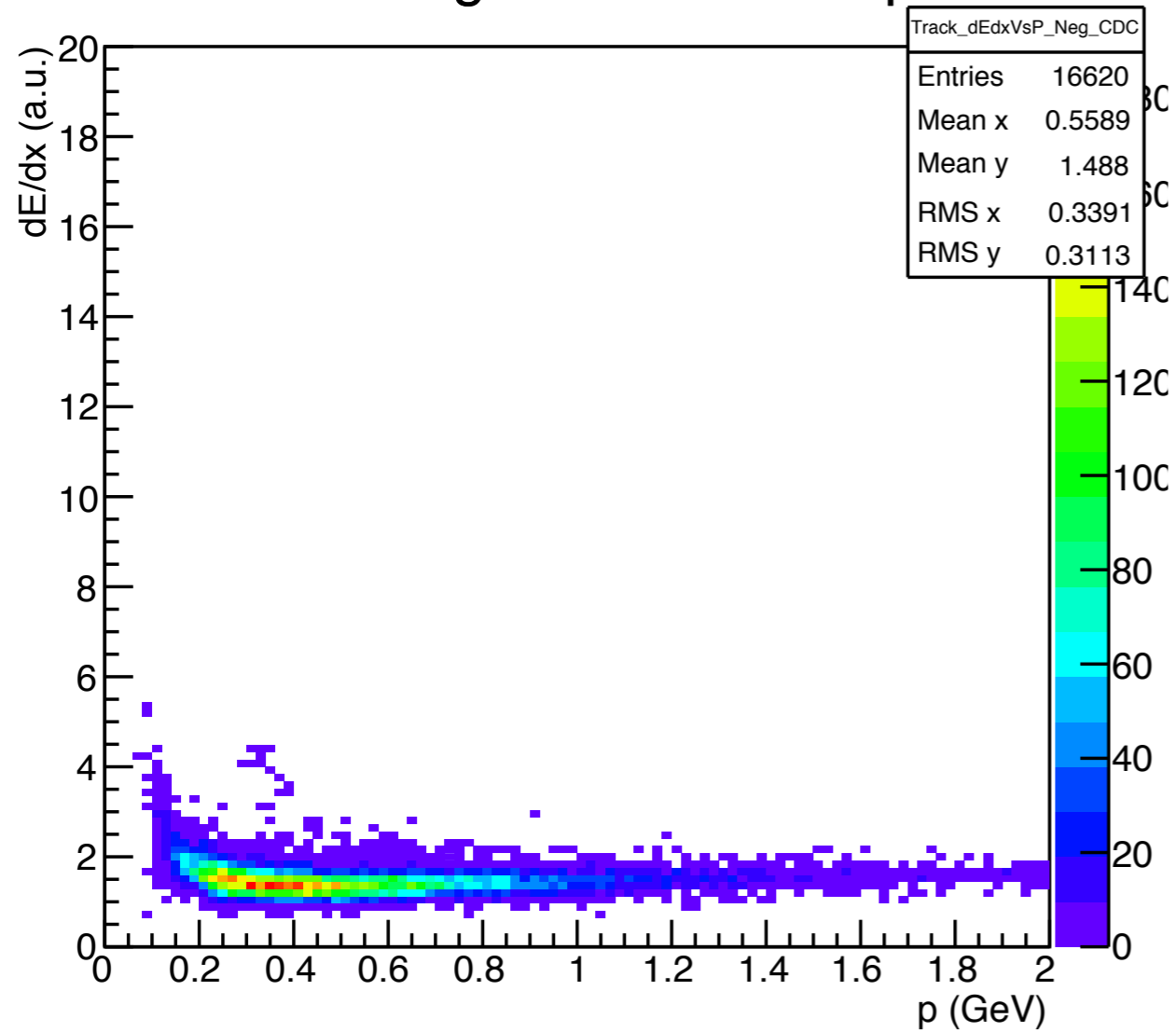
BCAL trigger: runs 1553, 1556, 1557, and 1558

MC comparison

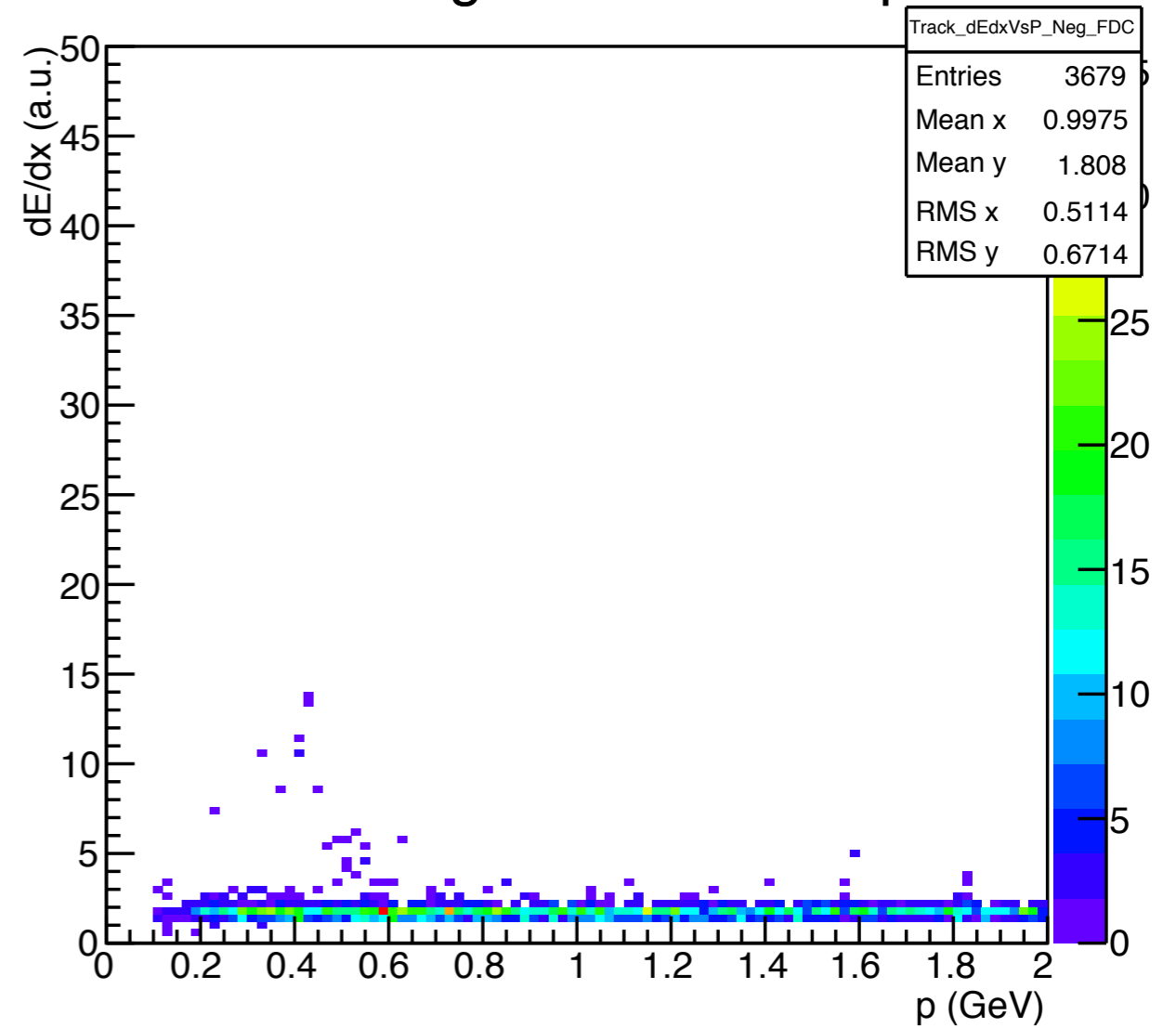
- Possible old detcom_01 simulation not compatible with updated FDC geometry, causing previous issues with the FDC plots
- Generated new bggen MC data with hdds and sim-recon commissioning branch rev16514 (prior to FDC geometry update) for “run” 9101 with solenoid at 1200 A
- Use same track requirements as data
- With new simulations see the expected 2 band structure for positive tracks and a single band for negative tracks

Negative Tracks: dE/dx vs p

CDC Negative: dE/dx vs p



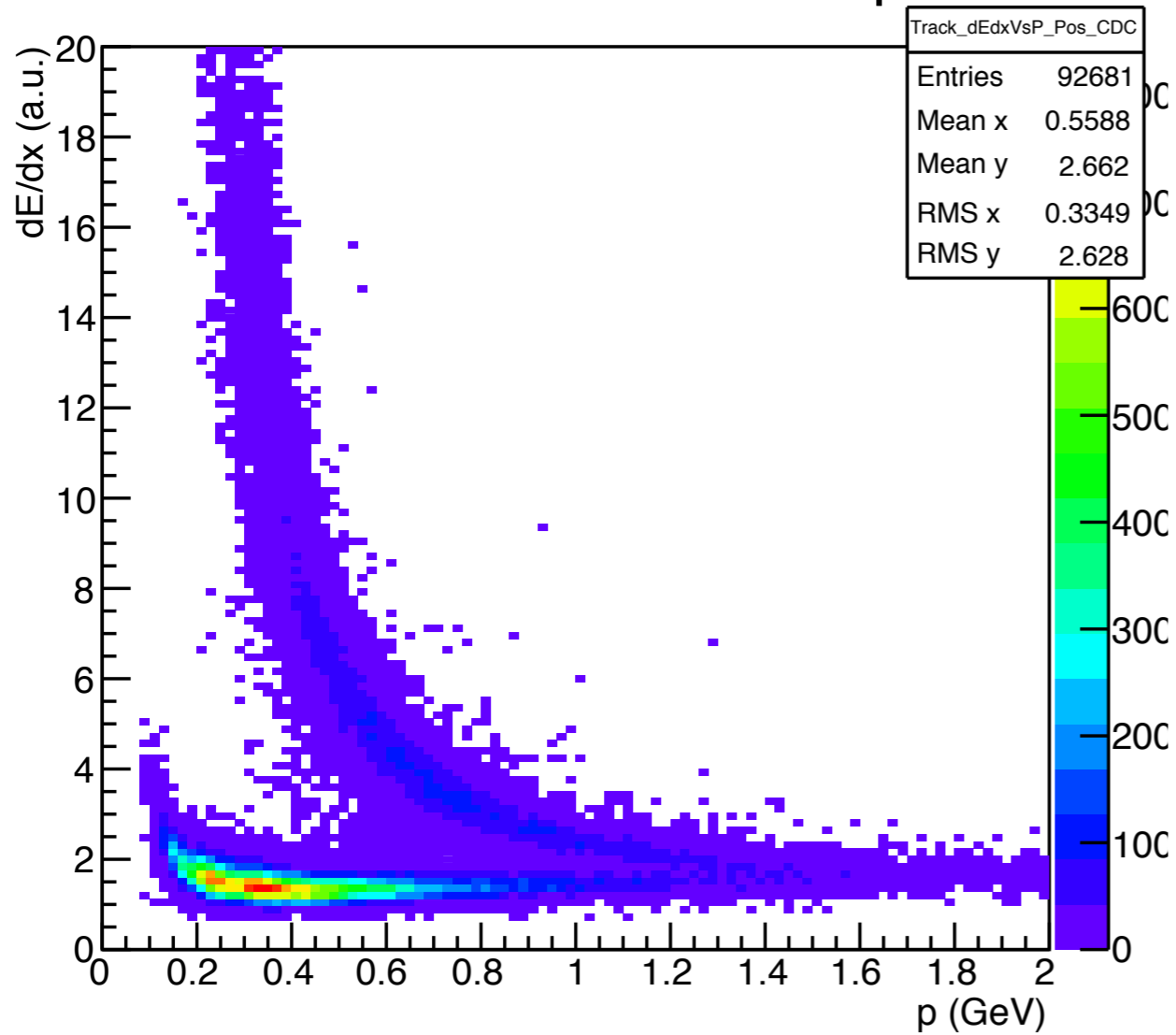
FDC Negative: dE/dx vs p



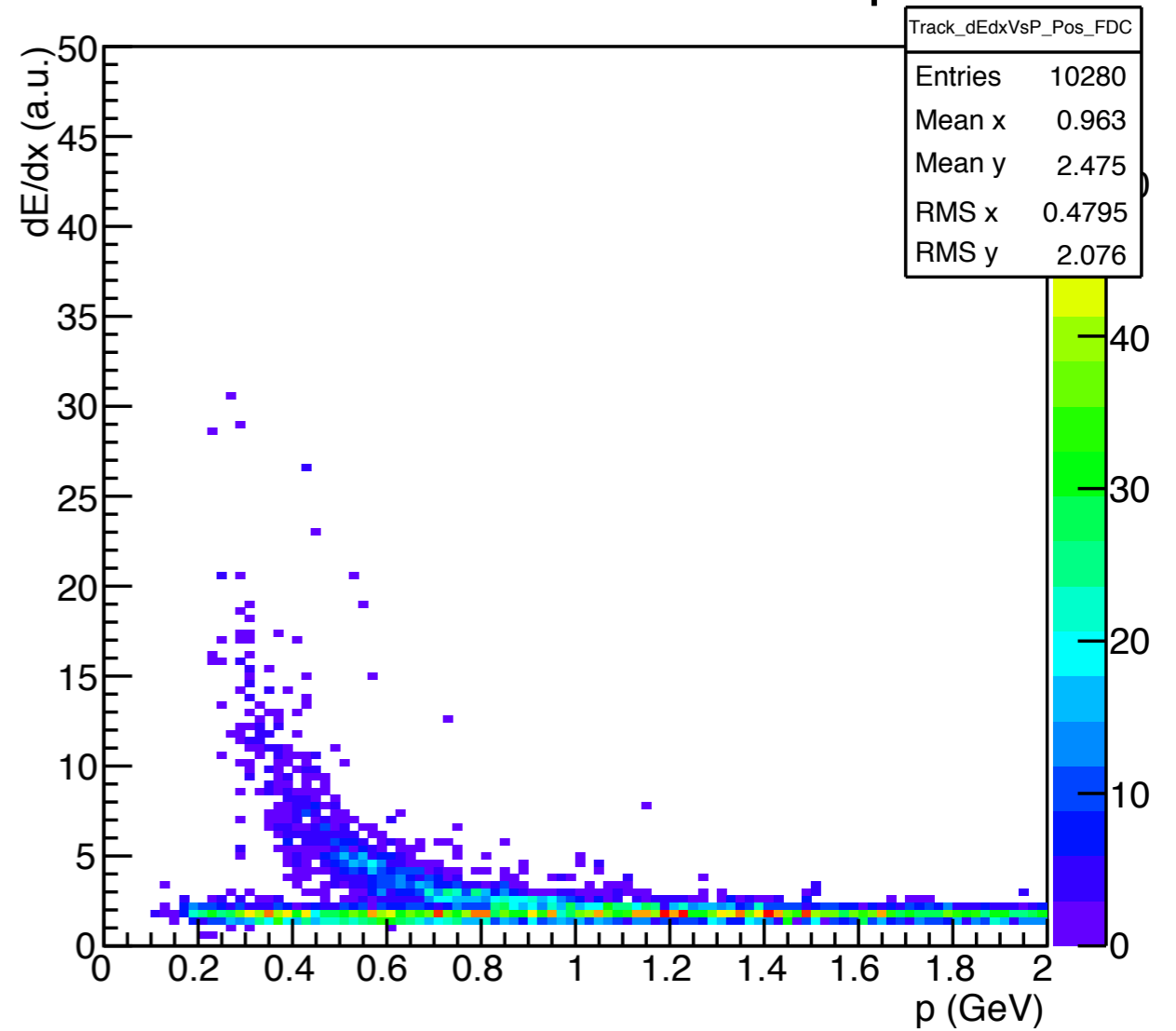
New bggen MC from "run" 9101

Positive Tracks: dE/dx vs p

CDC Positive: dE/dx vs p





FDC Positive: dE/dx vs p



New bggen MC from "run" 9101

Summary

- Although dE/dx energy scale is not calibrated, observe 2 bands in dE/dx vs p for positive tracks and only 1 band for negative tracks
- I haven't found any features in the dE/dx reconstruction code which is charge dependent that would cause this
- The 2nd band for positive tracks is consistent with being due to protons
- Distributions from bggen MC improved with newly generated sample
- I would rather choose between  or  but protons are ok too