

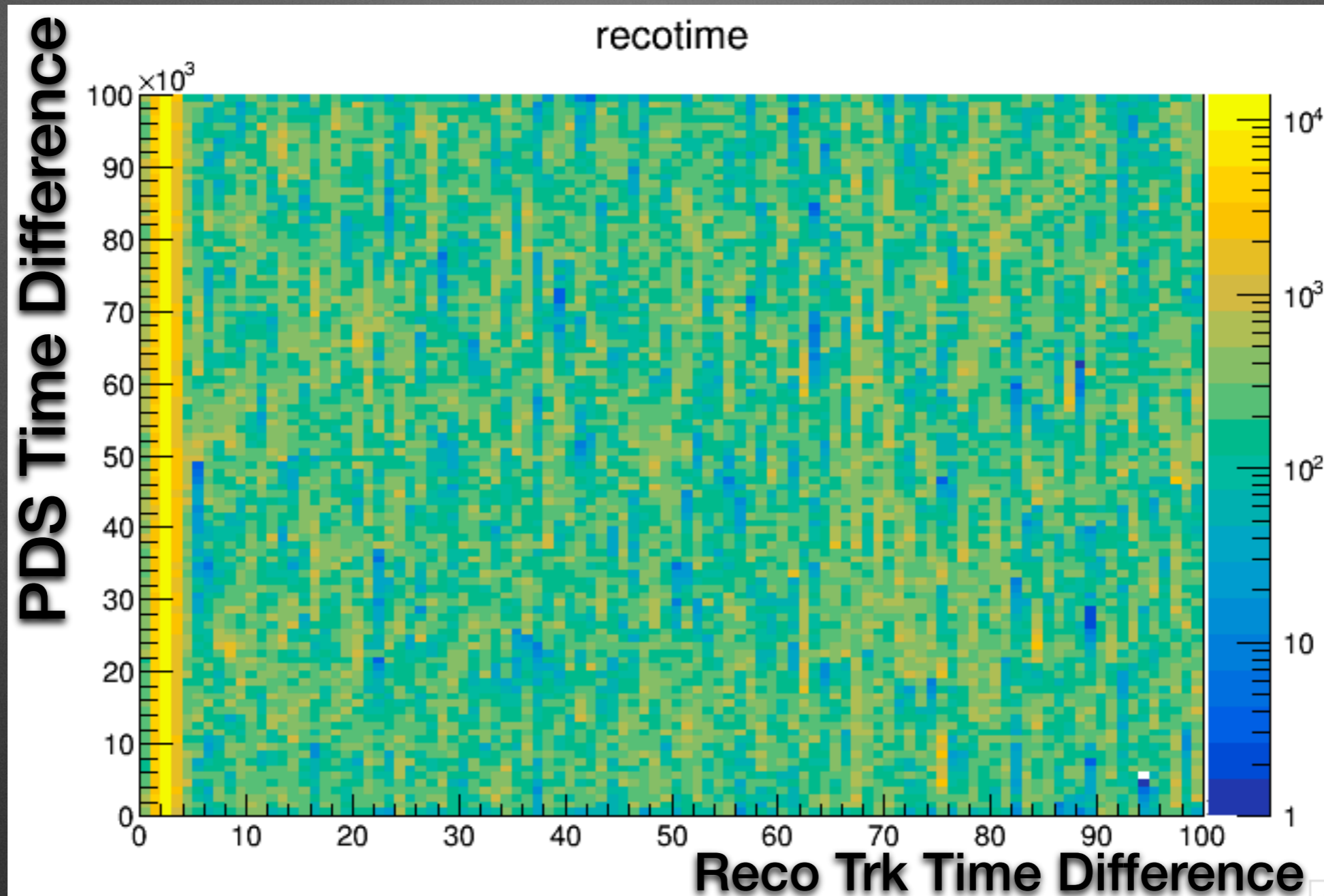
ProtoDUNE CRT+TPC+PDS Cosmic Matching (Update)

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May 16, 2019
ProtoDUNE PDS WG

Run Selection

- Data: used TPC reco'd runs 5785, 5786, 6119, 6120, 6141, 6191, and 6201 ~(5,000 reco'd files)
- MC: used TPC reco'd MC from samweb definition "jhugon_mcc11_pd_sp_reco_sce_-1.0GeV" with beam energies extending from 1-7 GeV ~(3850 reco'd files, 10 events per file)
- Used only Pandora tracks. MC was verified to be a thoroughgoing cosmic muon.

Timing Selection



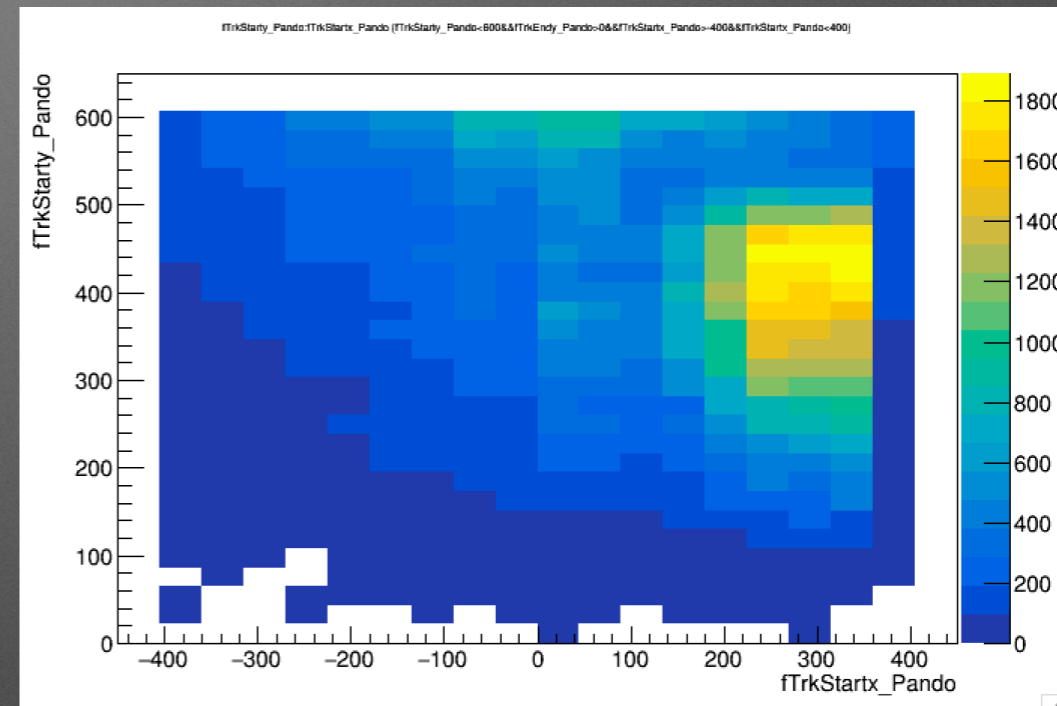
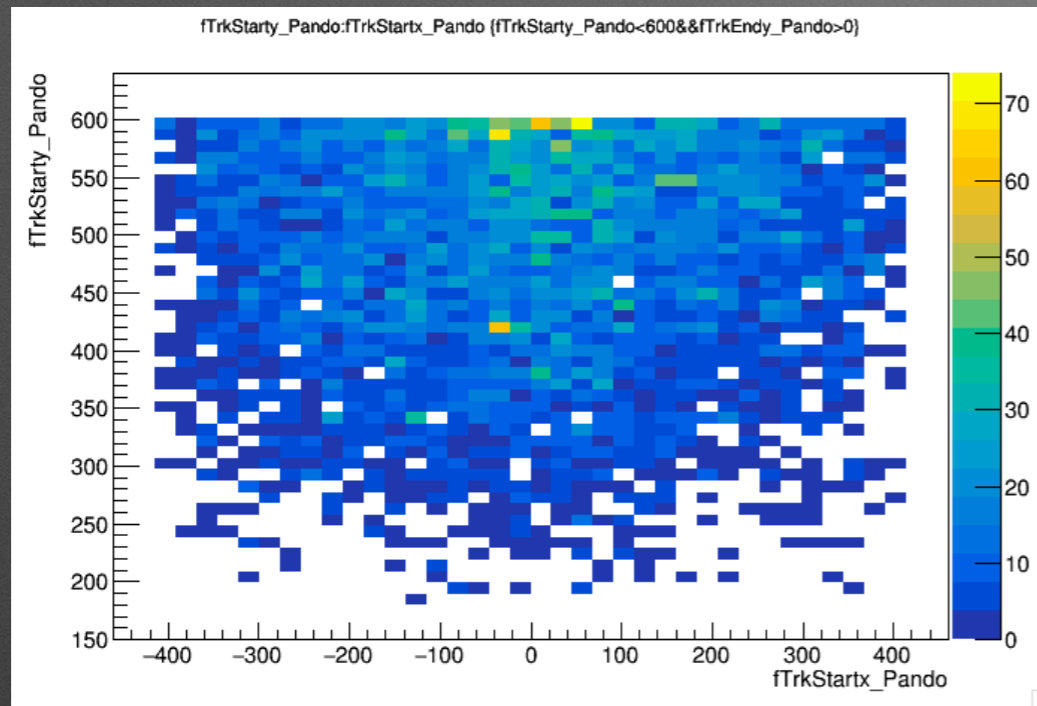
Units of microseconds

Raw Sample Size

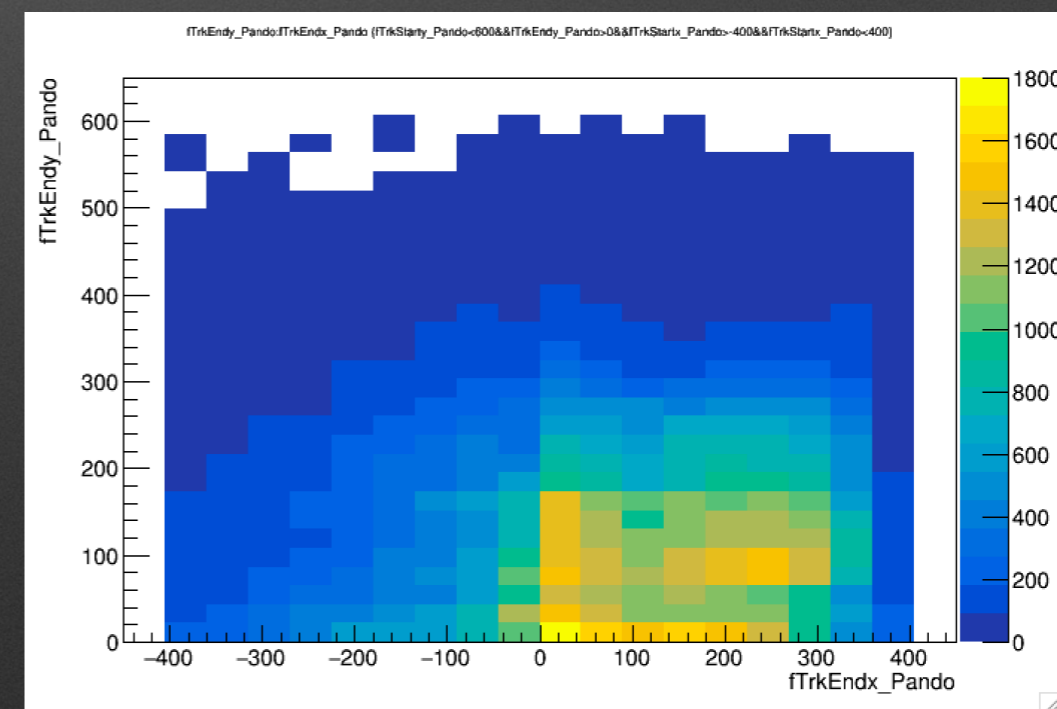
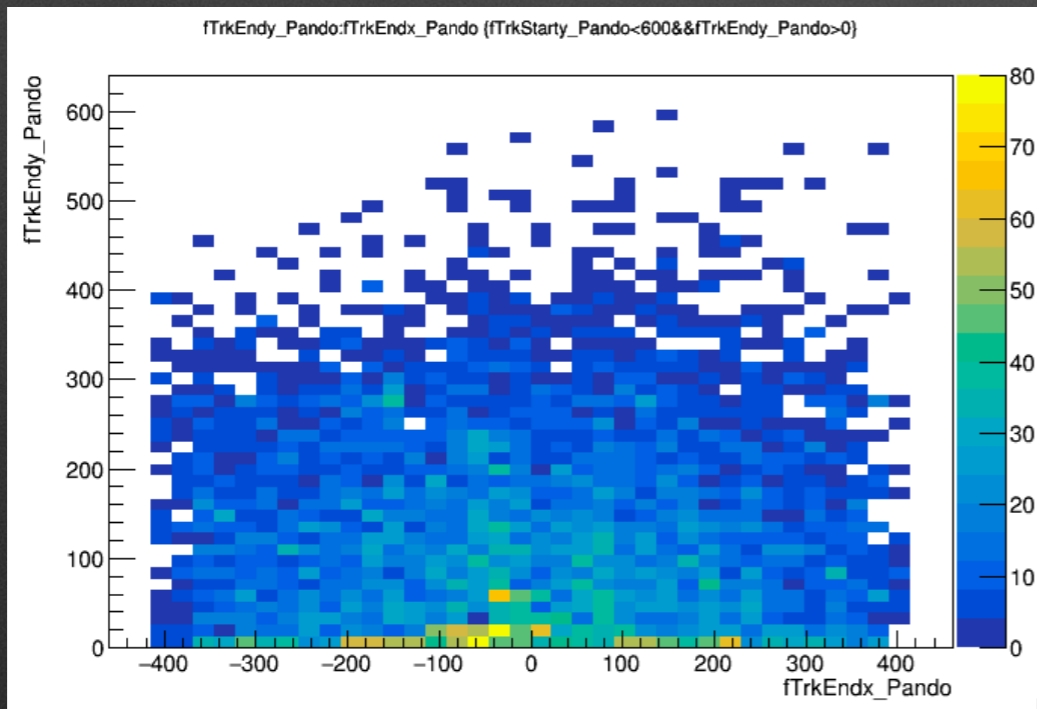
MC

Data

Start

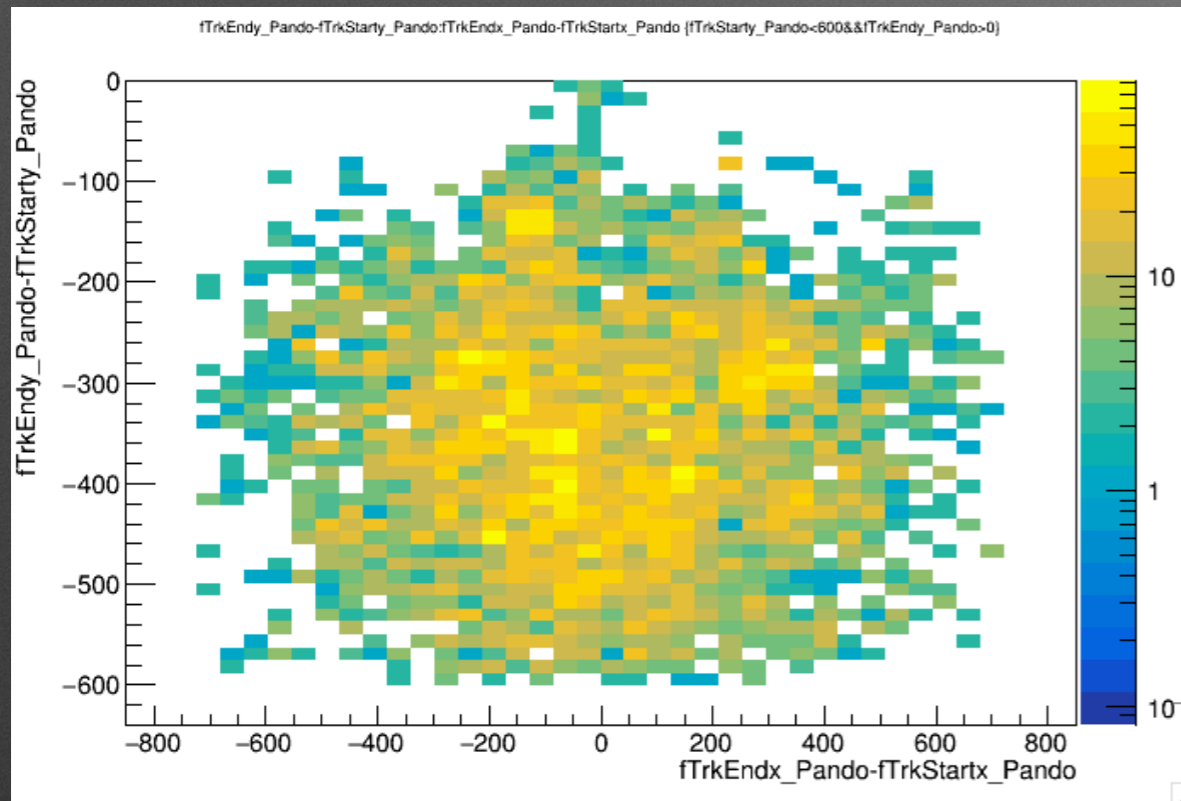


End

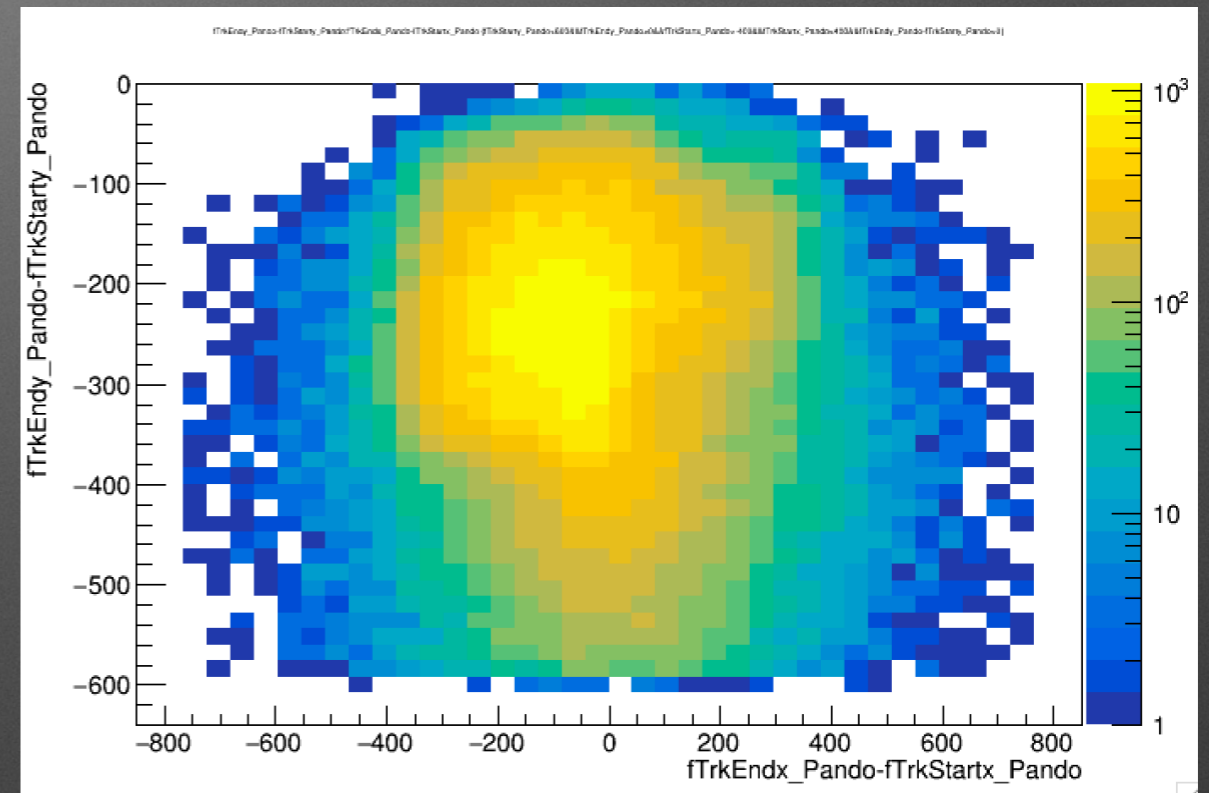


Raw Sample Angular Distribution

MC



Data



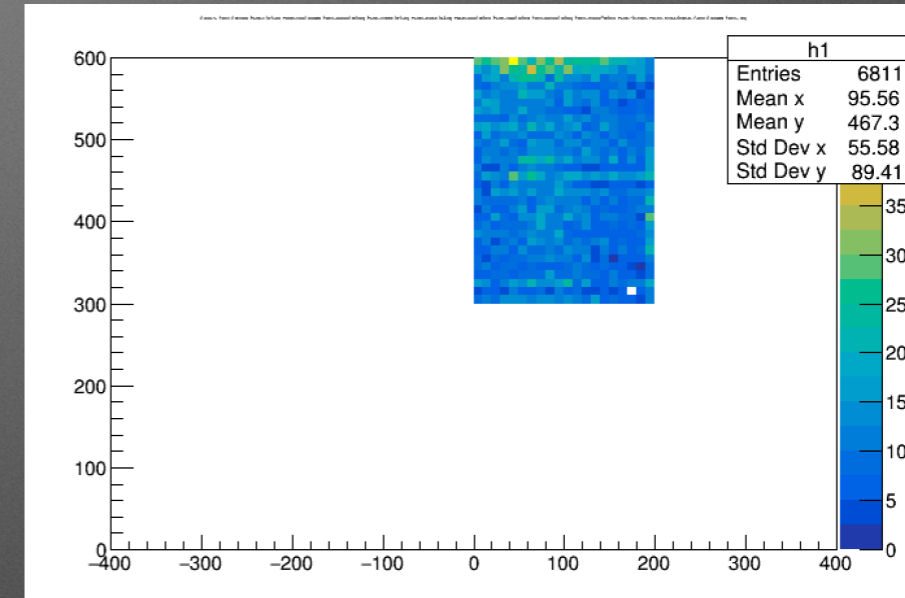
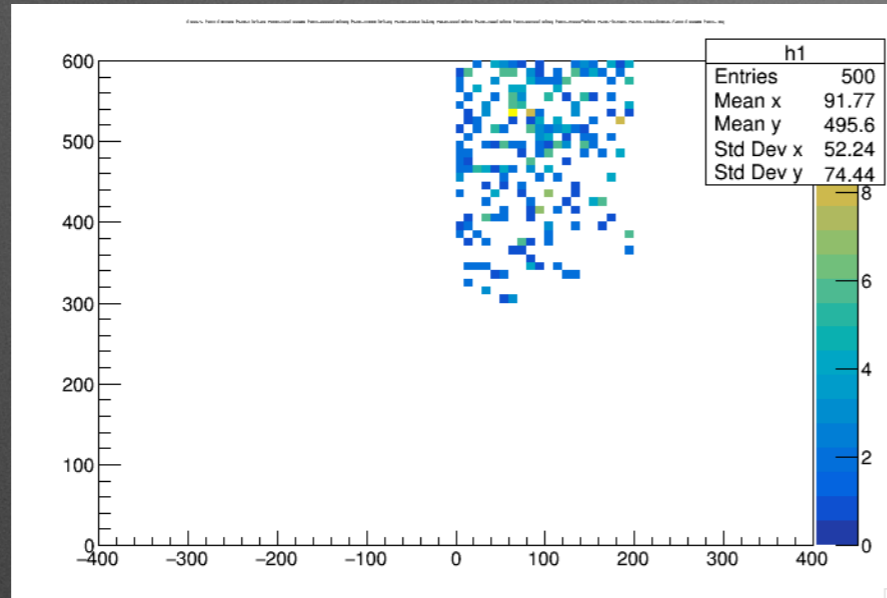
- About ~14,500 MC muons vs ~154,000 data muons
- Samples can be cut to agreement

Sample Cuts Size

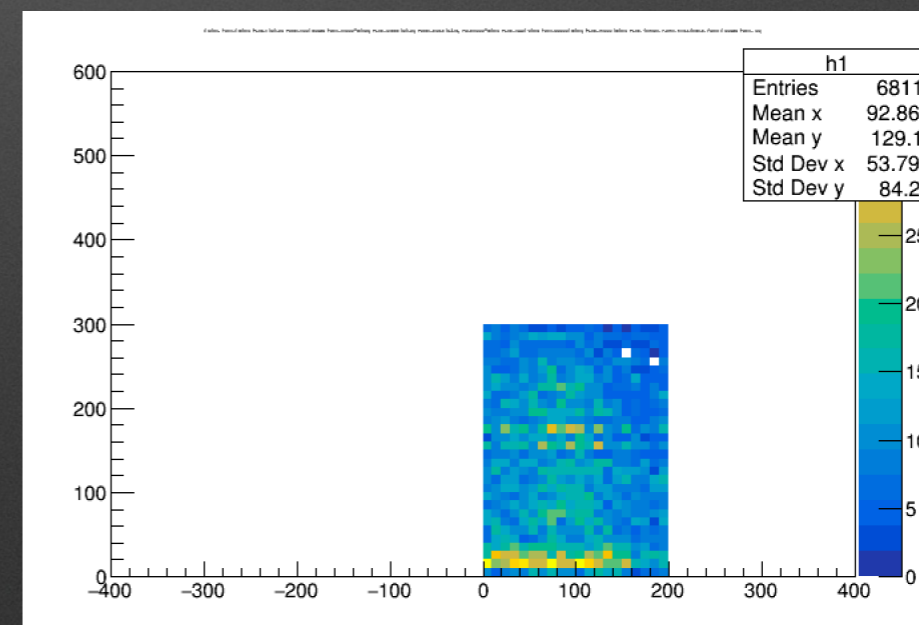
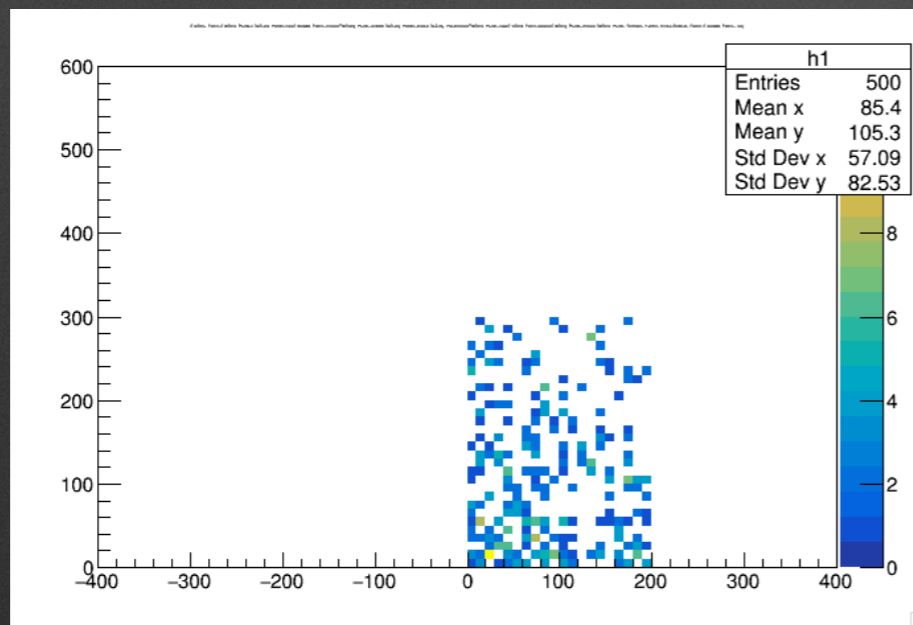
MC

Data

Start



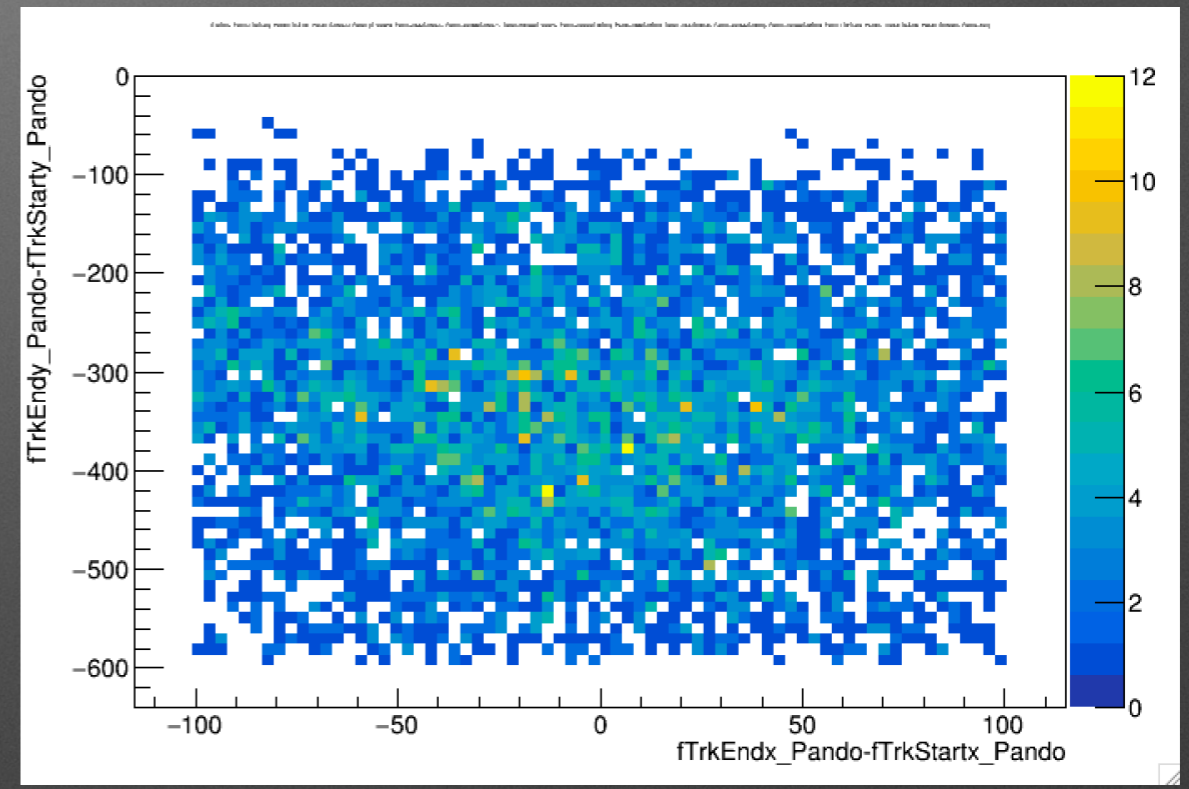
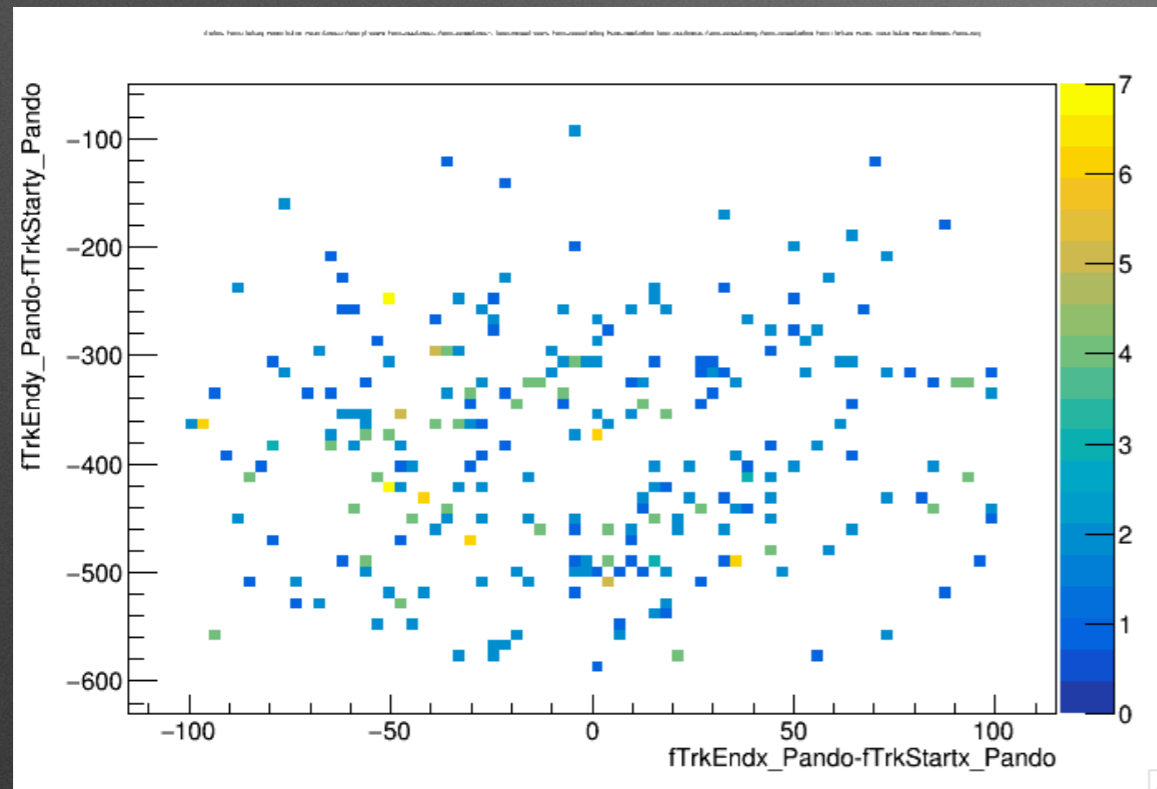
End



Raw Sample Angular Distribution

MC

Data



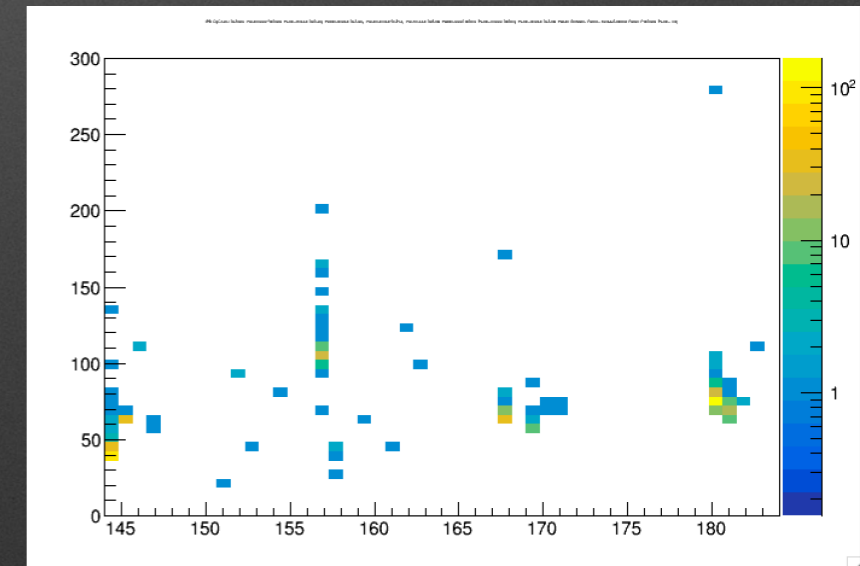
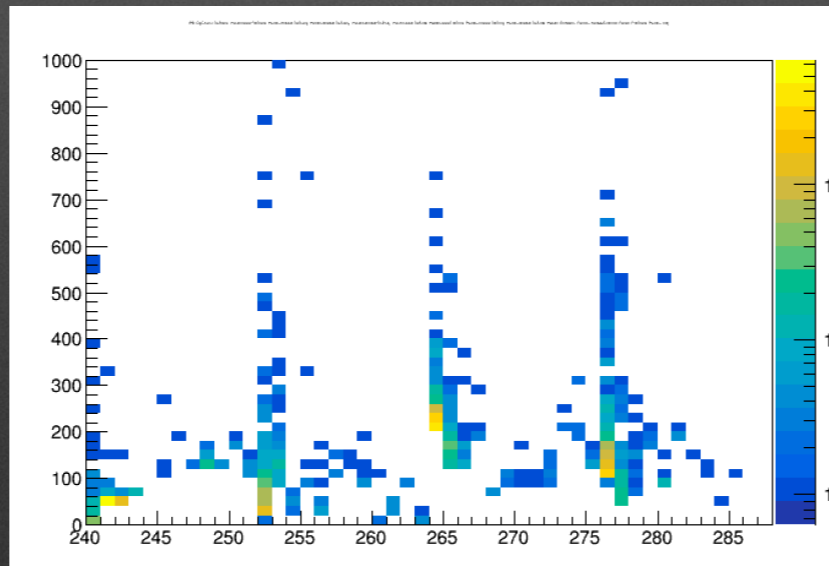
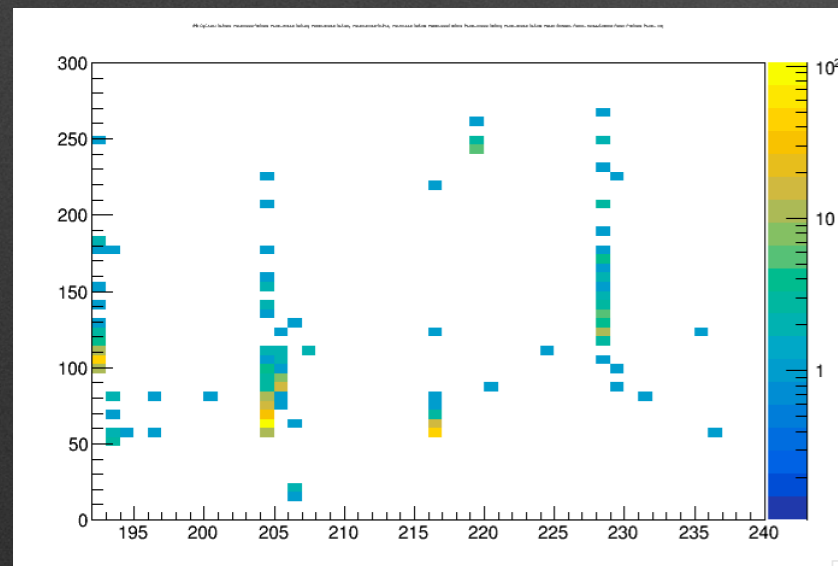
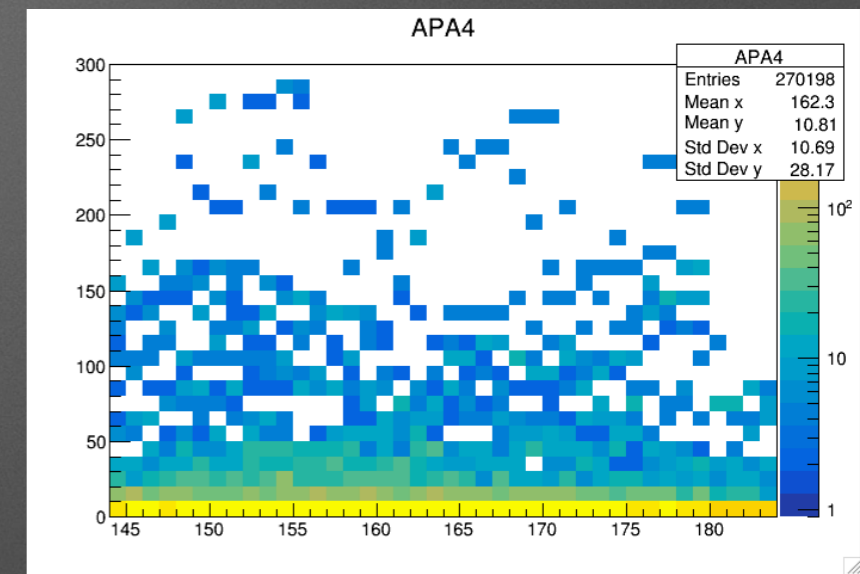
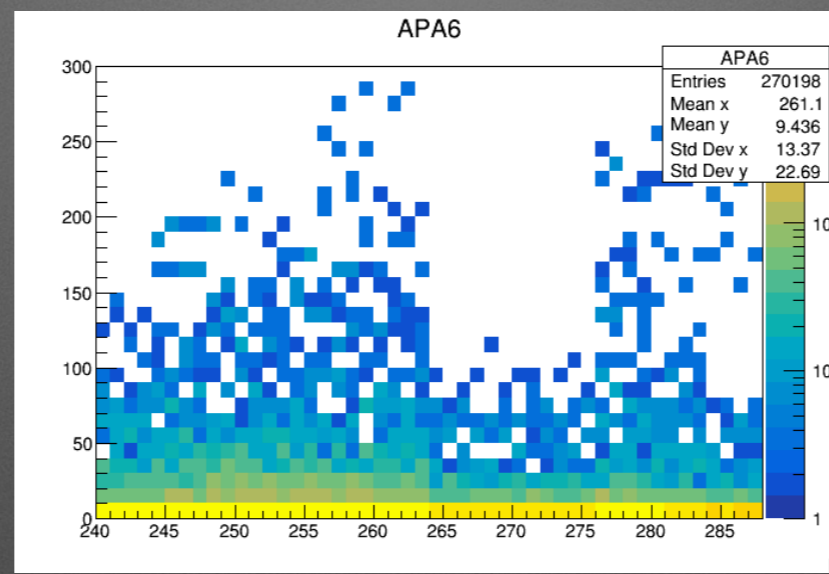
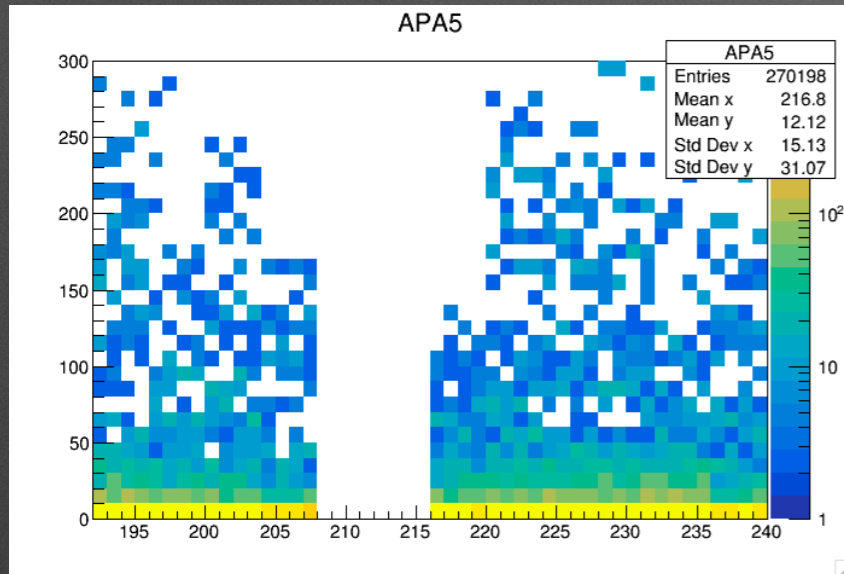
- About ~500 MC muons vs ~6,800 data muons
- MC sample size suffers

PDS Response

MC APA5

APA6

APA4



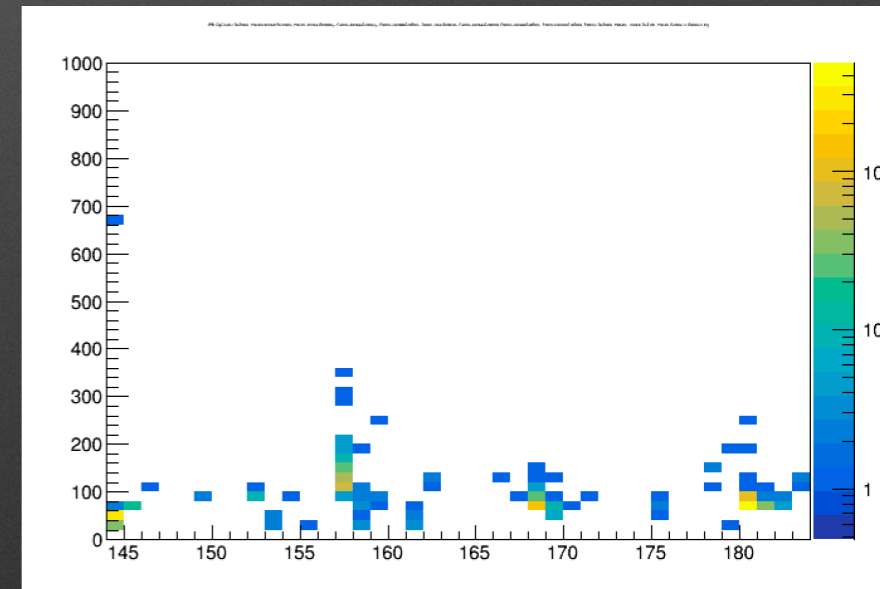
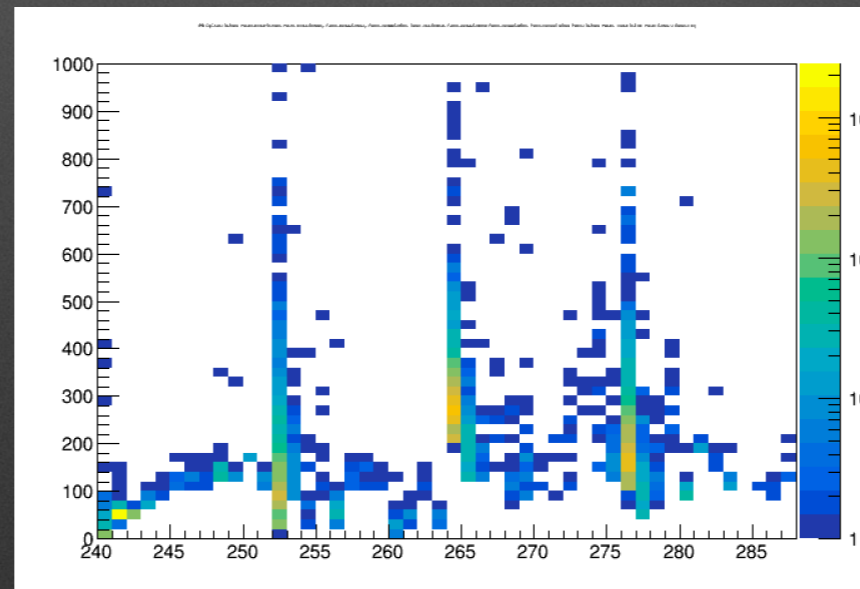
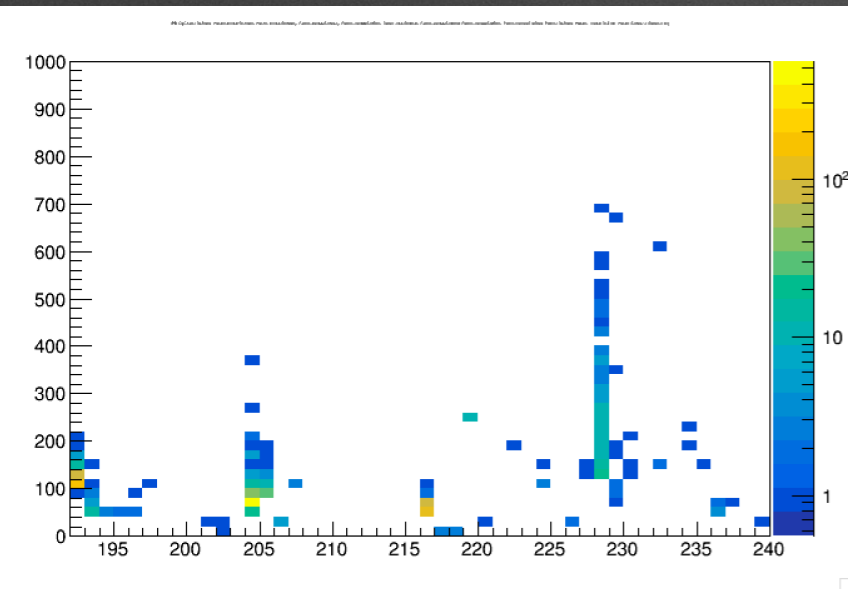
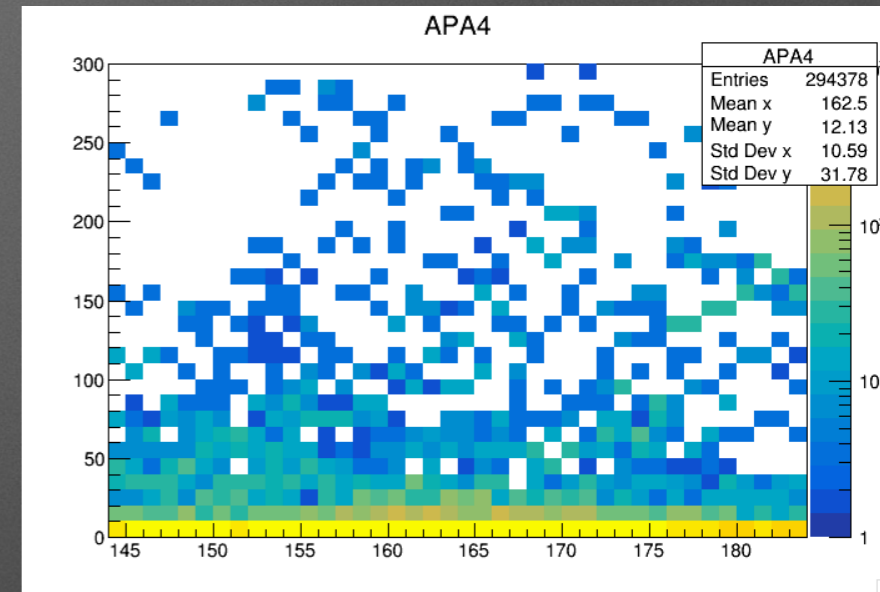
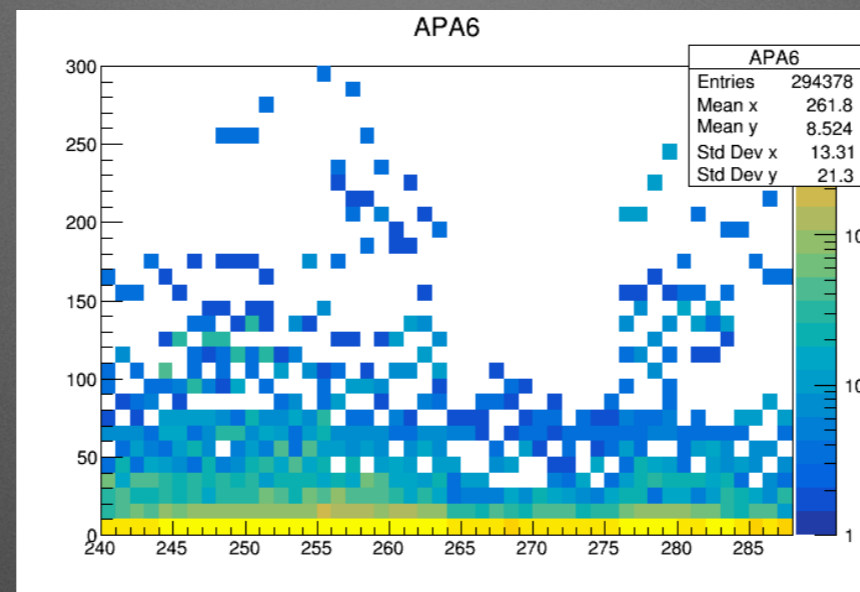
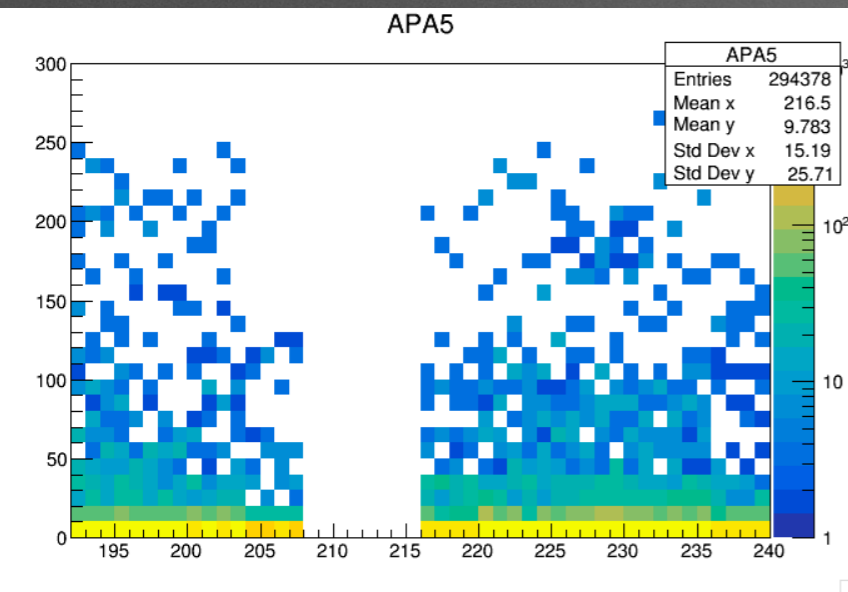
Data

PDS Response

MC APA5

APA6

APA4



Data

*Tracks brought 2 meters closer to APAs