

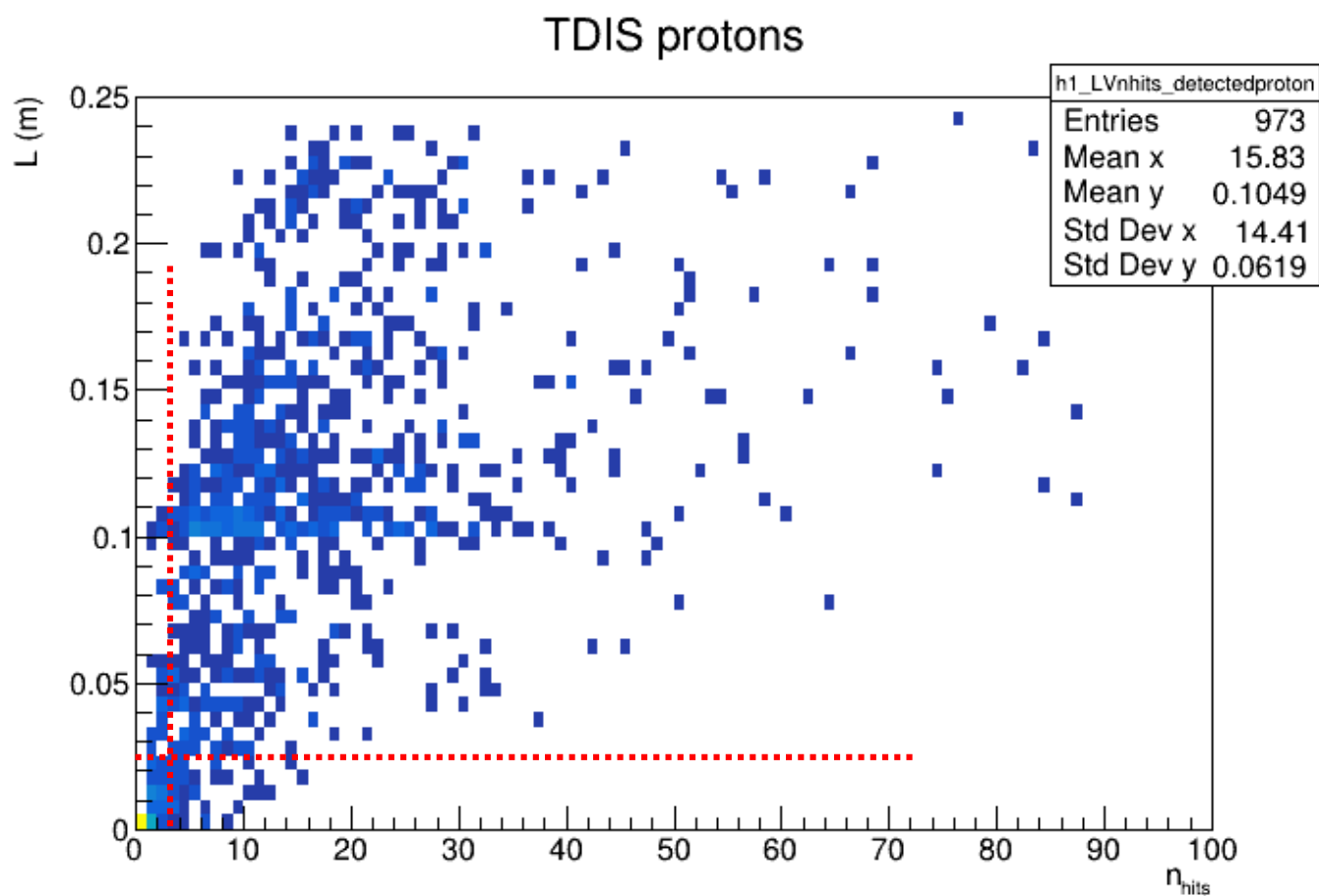
TDIS vs Elastic

Eric Fuchey
William & Mary



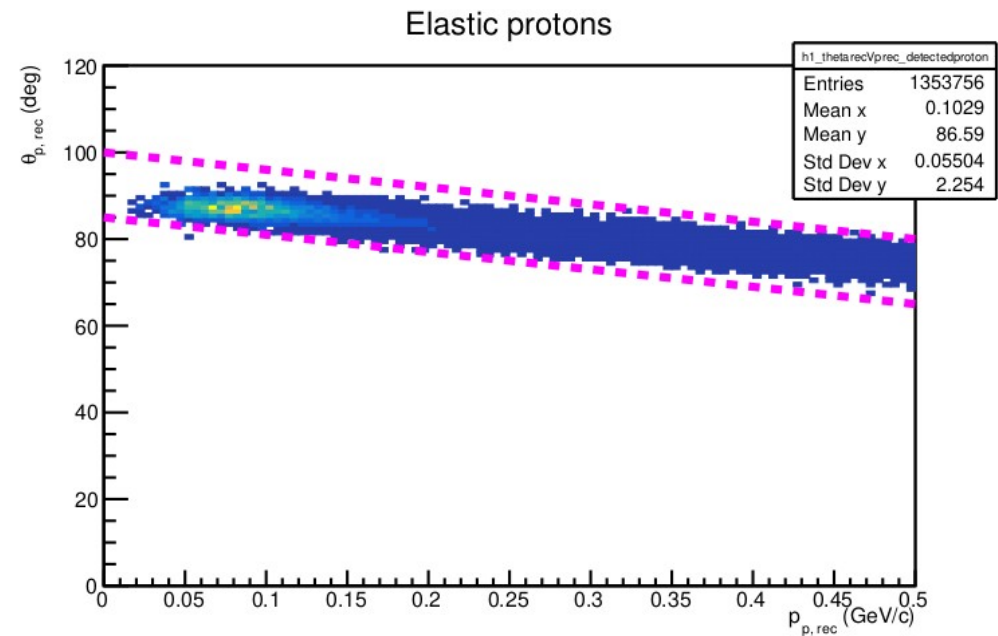
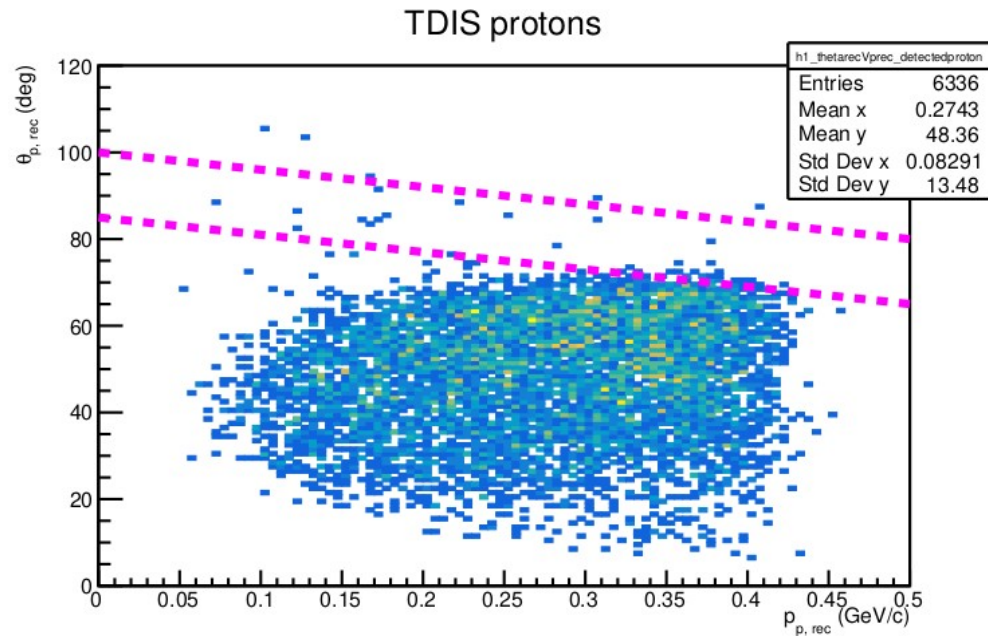
Proton selection (Elastic and TDIS)

- Simulations: TDIS and elastic on H2 and D2, magnetic field 1.5T;
- Track requirements:
 - Track total path length *inside the mTPC* ≥ 0.025 m (can be adjusted);
 - Number of hits ≥ 3 ;



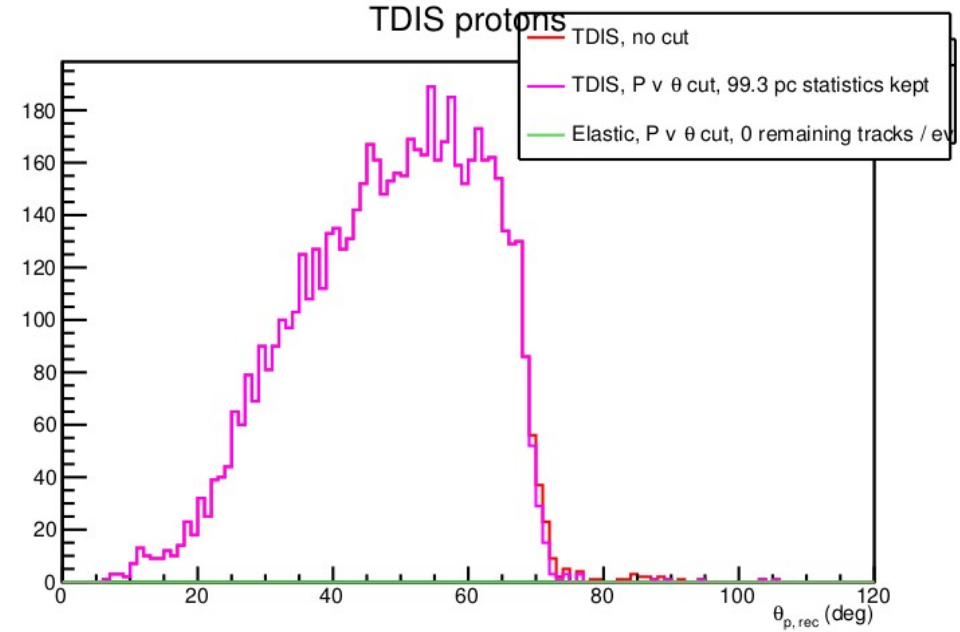
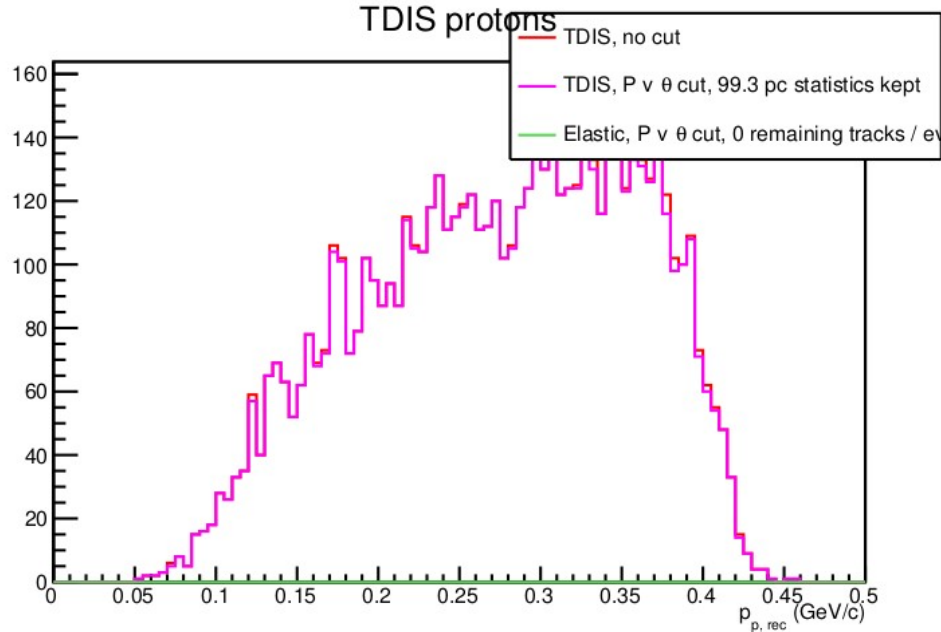
TDIS vs Elastic proton, LH2, 1.5T

- *Generated* p vs θ ;
- Tracks with total path length ≥ 0.025 m, number of hits ≥ 3 ;
- “reconstructed” p vs θ ;
 - p_{gen} smeared by 0.02 GeV/c,
 - θ_{gen} smeared by 1.5 deg
- Cut : $85-p*40 \text{ (deg)} < \theta < 100-p*40 \text{ (deg)}$



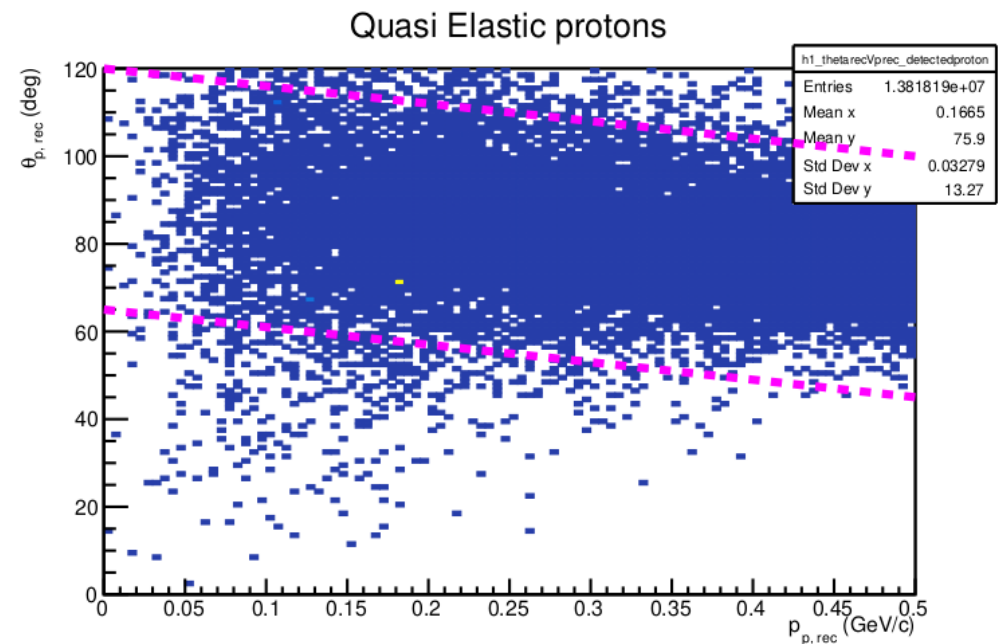
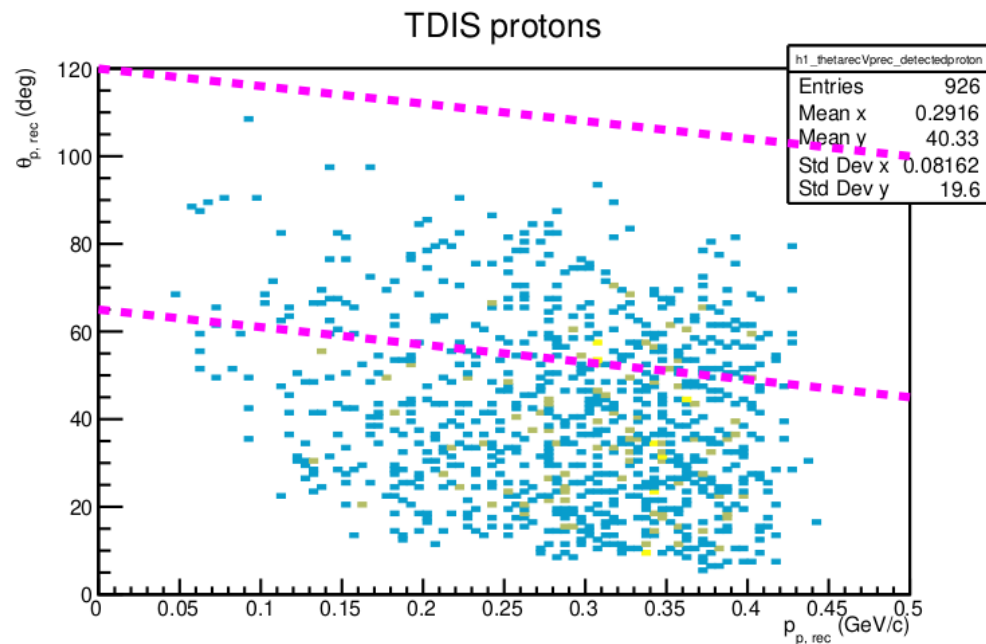
TDIS vs Elastic proton, LH2, 1.5T

- Cut : $85-p \cdot 40 \text{ (deg)} < \theta < 100-p \cdot 40 \text{ (deg)}$
 - removes all elastic contamination;
 - removes less than 1 % of TDIS protons on H2



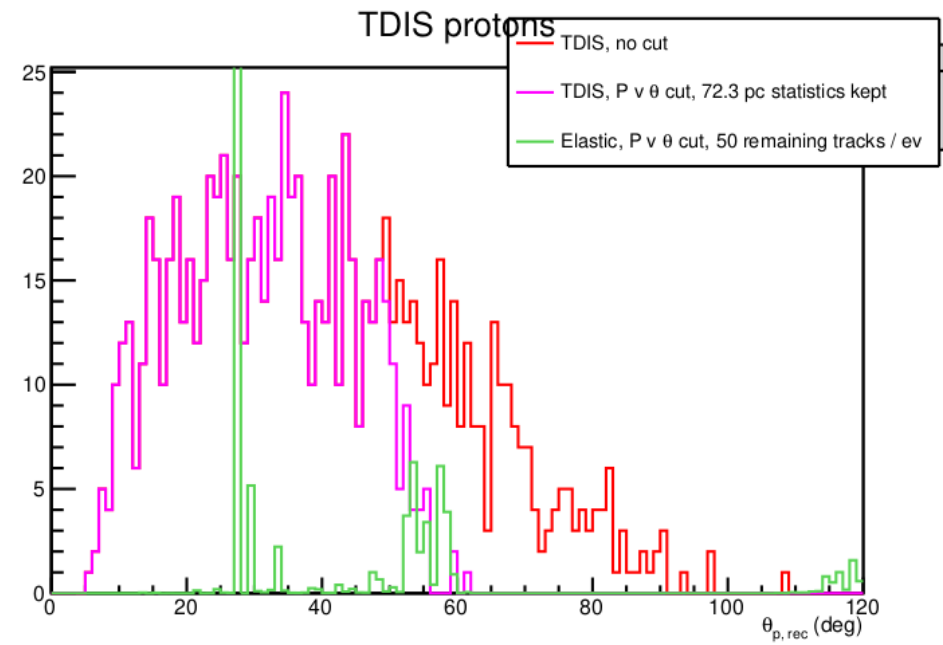
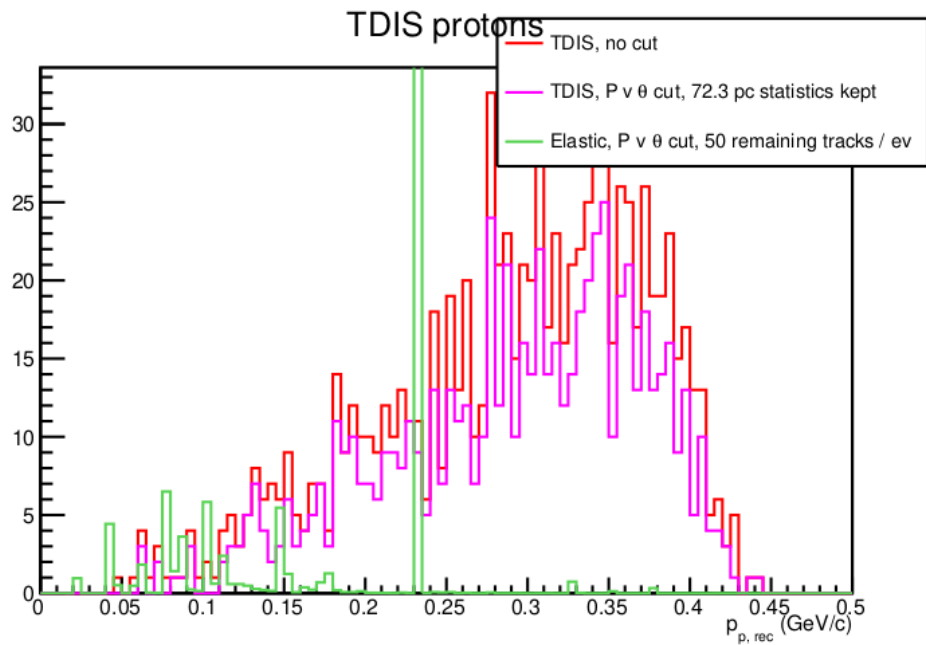
TDIS vs Elastic proton, LD2, 1.5T

- *Generated* p vs θ ;
- Tracks with total path length ≥ 0.025 m, number of hits ≥ 3 ;
- “reconstructed” p vs θ ;
 - p_{gen} smeared by 0.02 GeV/c,
 - θ_{gen} smeared by 1.5 deg
- Cut : $65 - p \cdot 40 \text{ (deg)} < \theta < 120 - p \cdot 40 \text{ (deg)}$



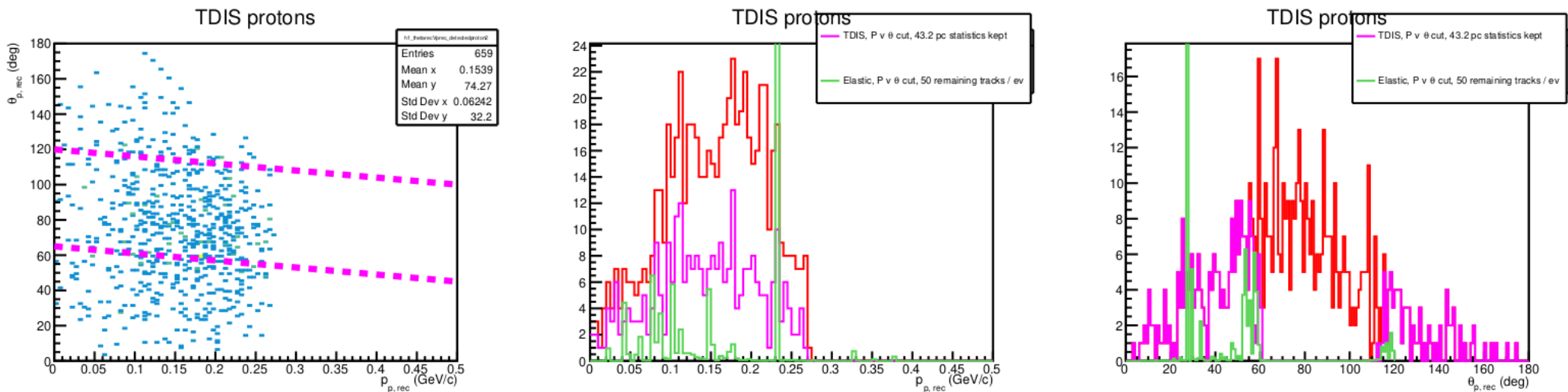
TDIS vs Elastic proton, LH2, 1.5T

- Cut : $65-p \cdot 40 \text{ (deg)} < \theta < 120-p \cdot 40 \text{ (deg)}$
 - ~50 quasi-elastic tracks remaining per event (down from ~330);
 - removes ~1/4 of TDIS protons on D2;



TDIS vs Elastic proton, LH2, 1.5T

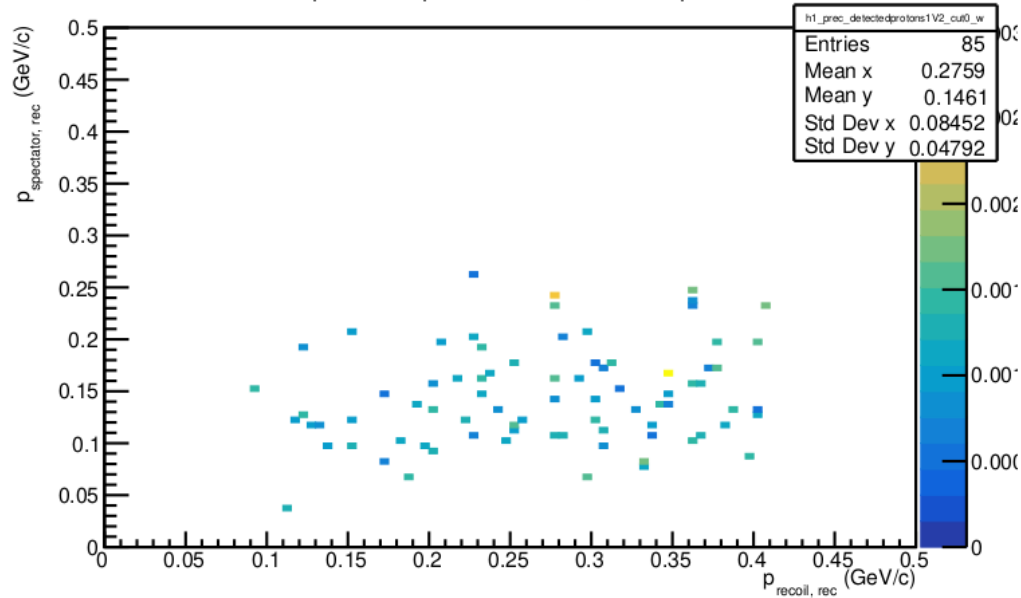
- Cut : $65-p \cdot 40 \text{ (deg)} < \theta < 120-p \cdot 40 \text{ (deg)}$
 - ~50 quasi-elastic tracks remaining per event (down from ~330);
 - removes ~1/4 of TDIS protons on D2;
 - removes ~1/2 of spectator protons on D2;



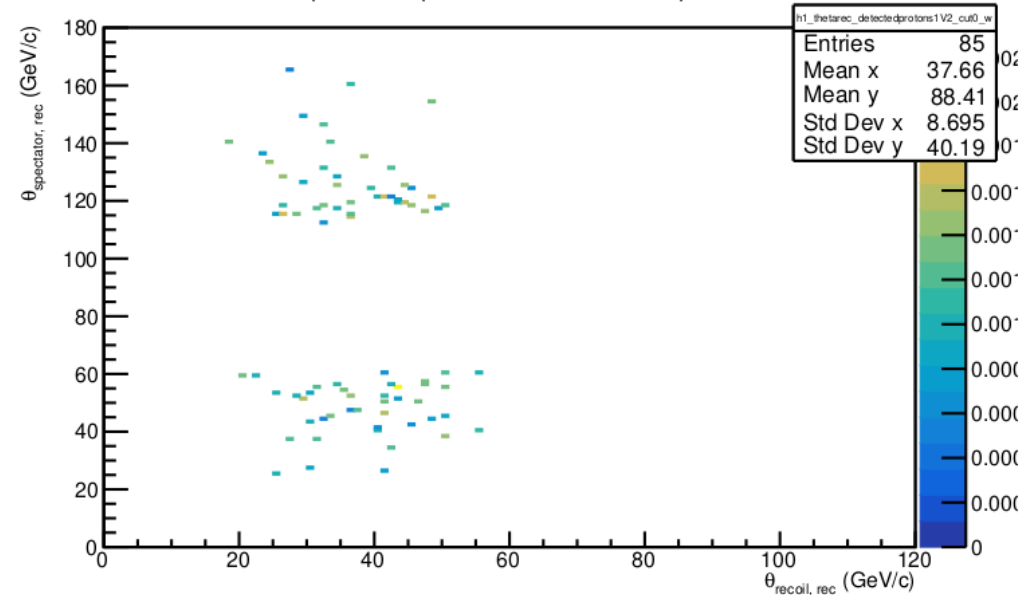
TDIS vs Elastic proton, LH2, 1.5T

- Cut : $65\text{-p}^{\circ}40 \text{ (deg)} < \theta < 120\text{-p}^{\circ}40 \text{ (deg)}$
 - ~50 quasi-elastic tracks remaining per event (down from ~330);
 - removes ~1/4 of TDIS protons on D2;
 - removes ~1/2 of spectator protons on D2;
 - removes 80% of TDIS+Spectator protons (too much);

TDIS vs Spectator proton on D2, 18.02 pc after cuts



TDIS vs Spectator proton on D2, 18.02 pc after cuts



Next Steps

- **TODO:**
 - Optimize cut for D2;