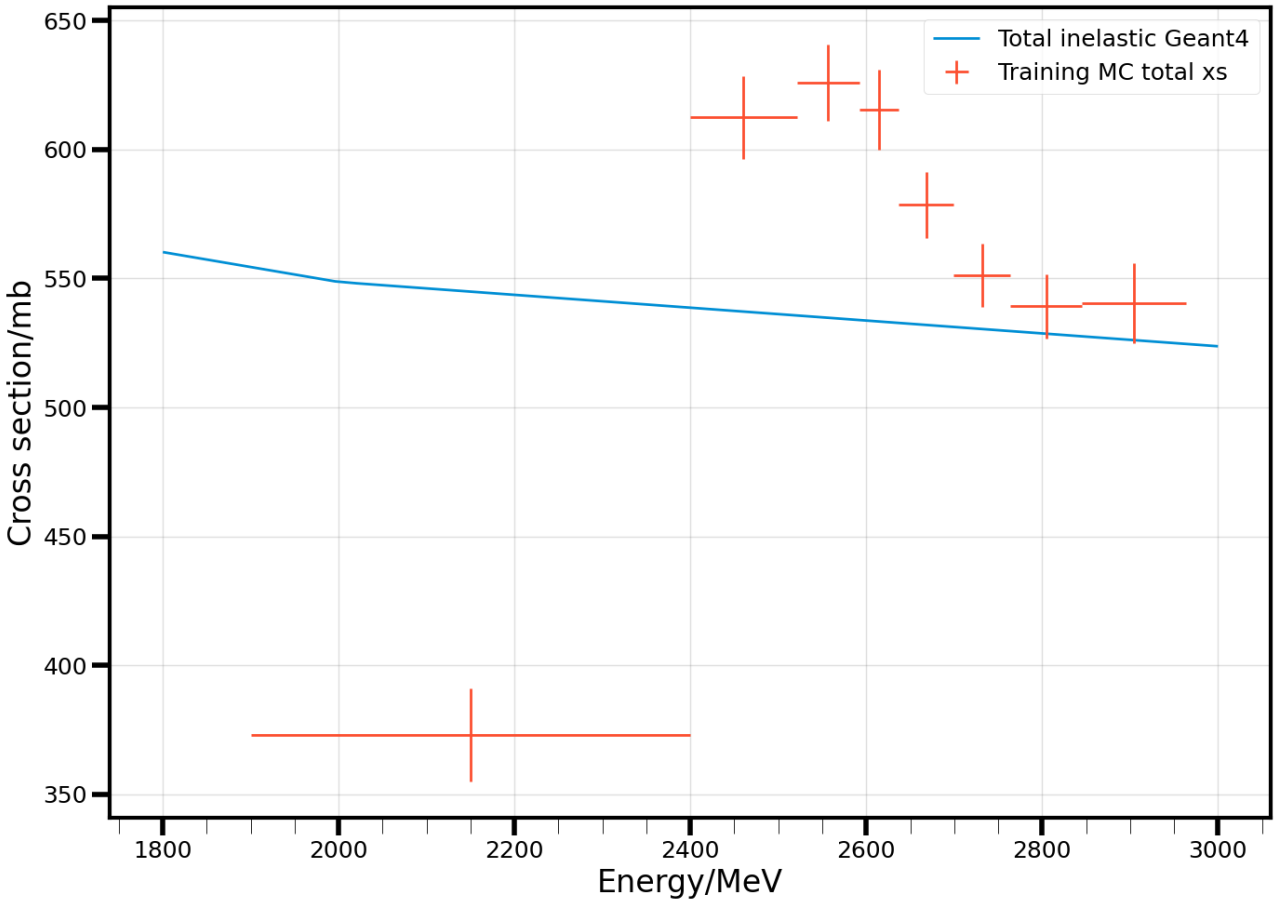
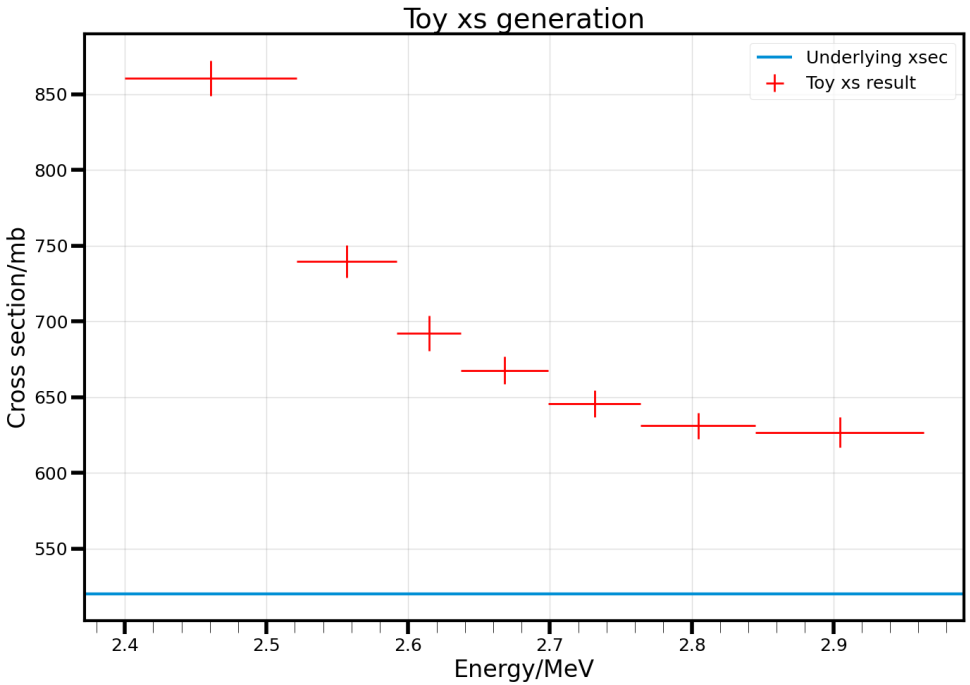
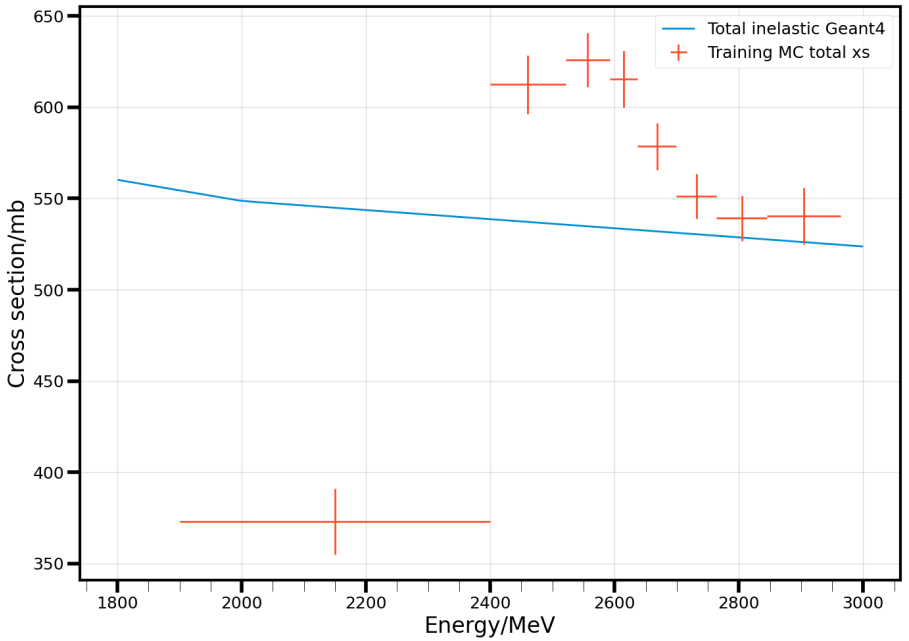
Initial attempt



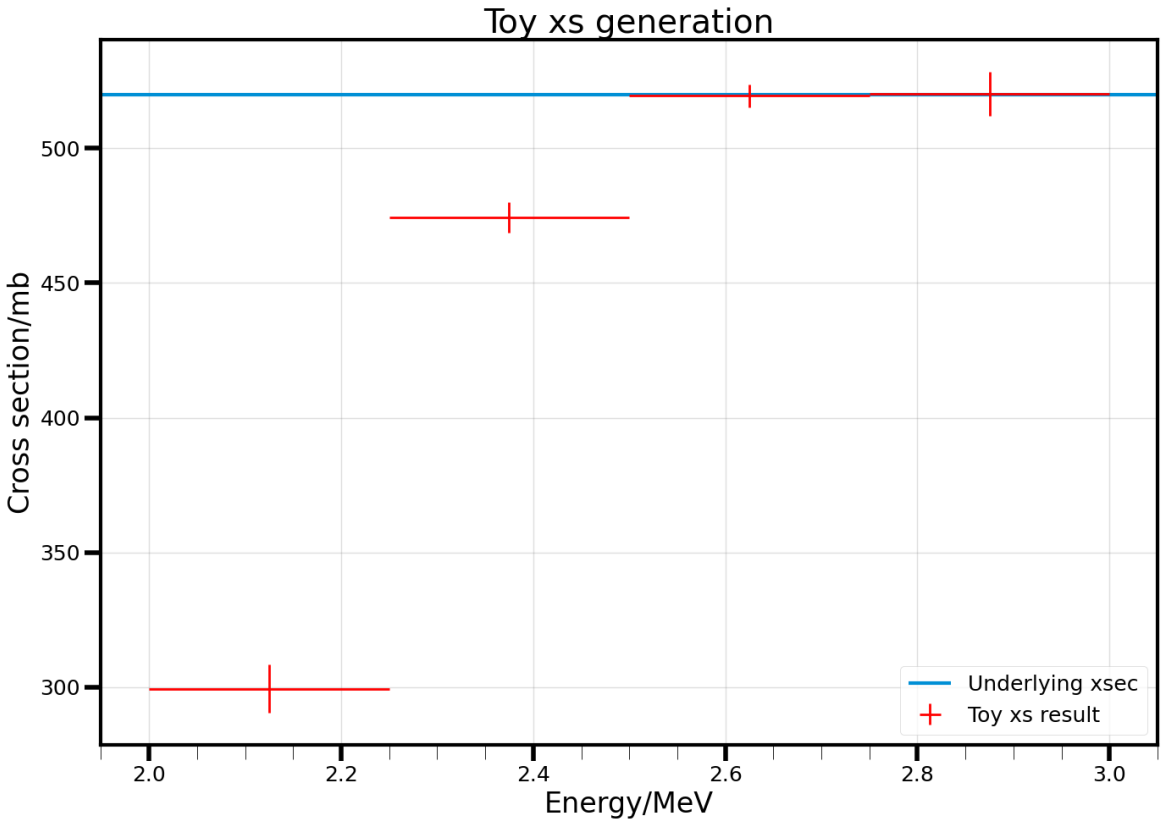
Toy fiducial cut

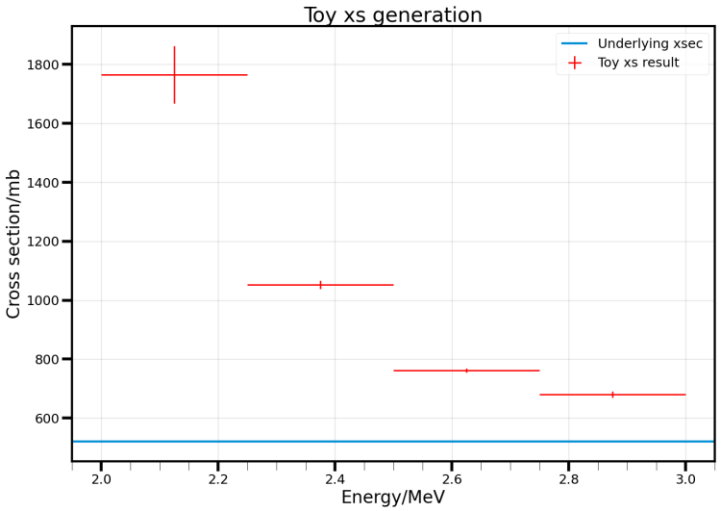




Yinrui's method

- Count ends as interactions.
- Scale cross section by interactions/ends

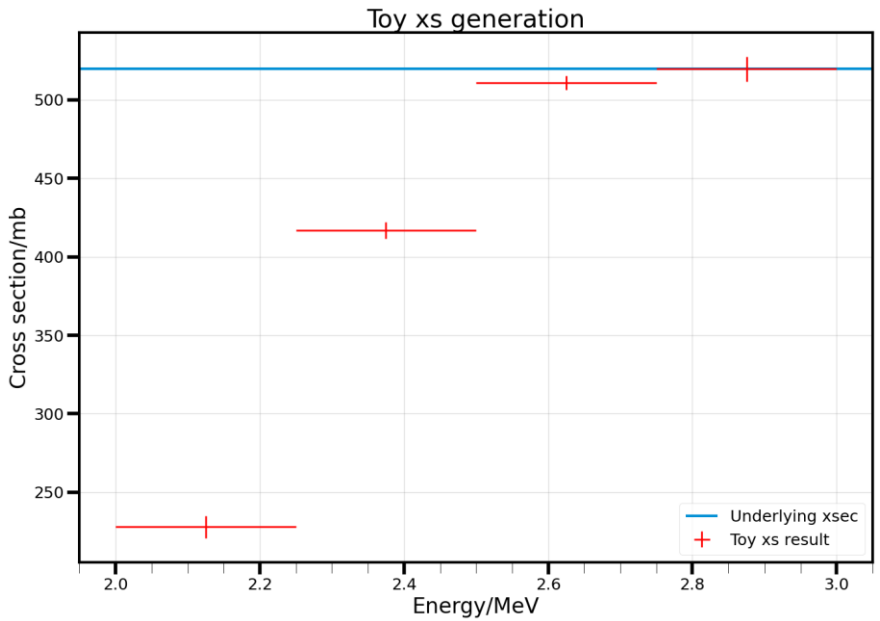




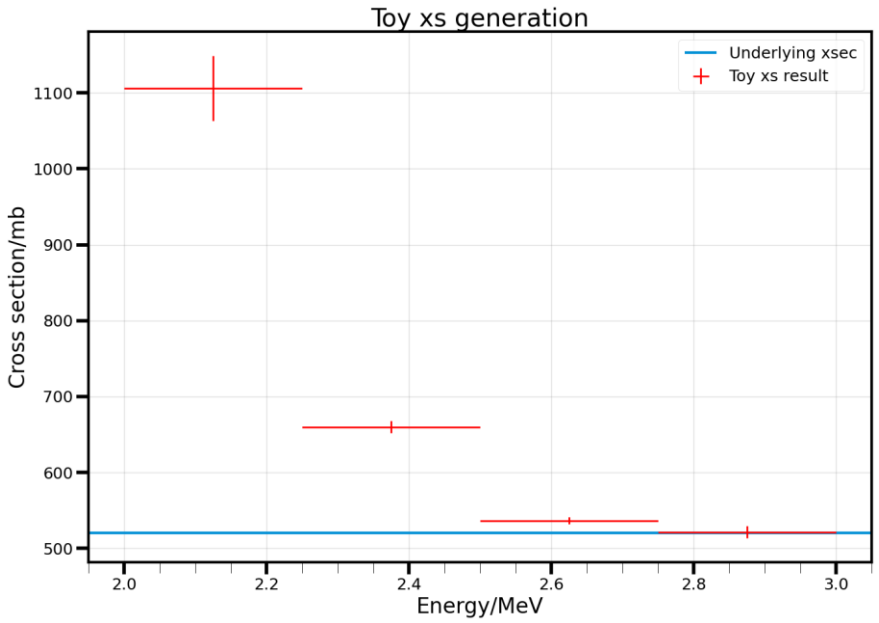
Other methods

- Tried ignoring the ends as interactions, but include as incident

Incident on final energy bin

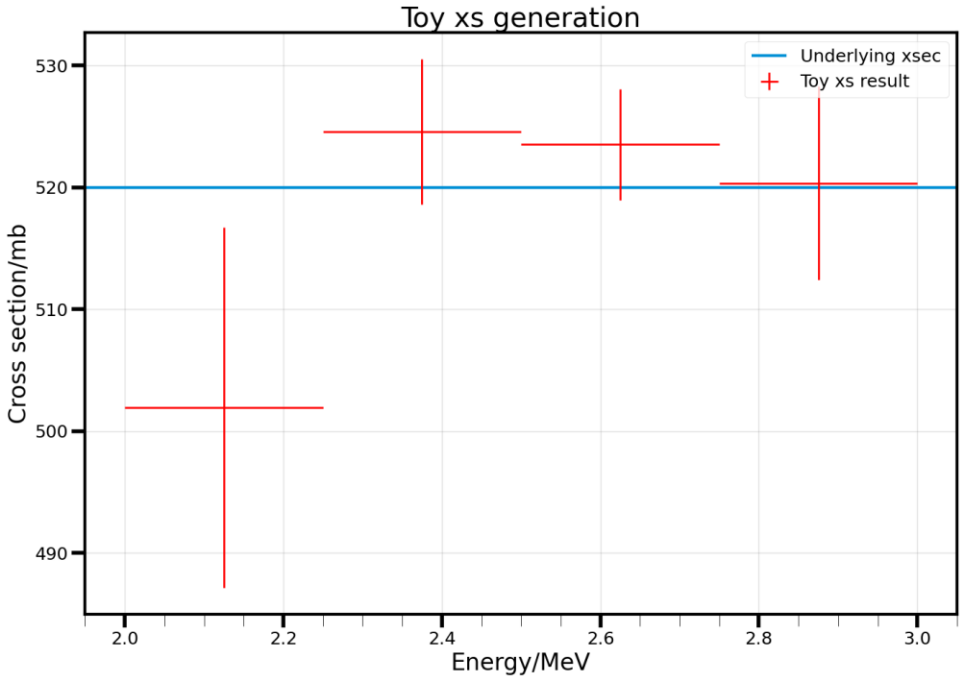


Not incident on final energy bin



Other methods

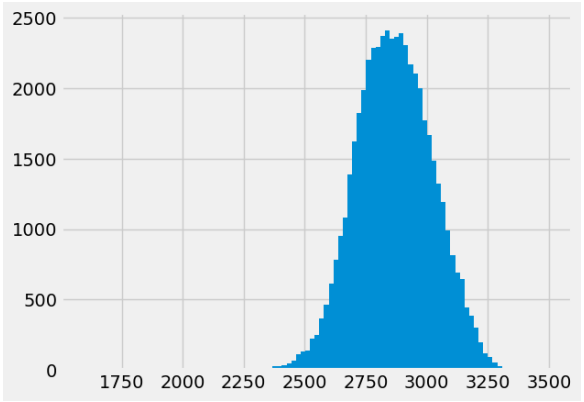
- Geometric mean of the two previous methods happens to give a nice looking result!
- Equivalent to choosing the fraction of ending events you think would have interacted in the bin.



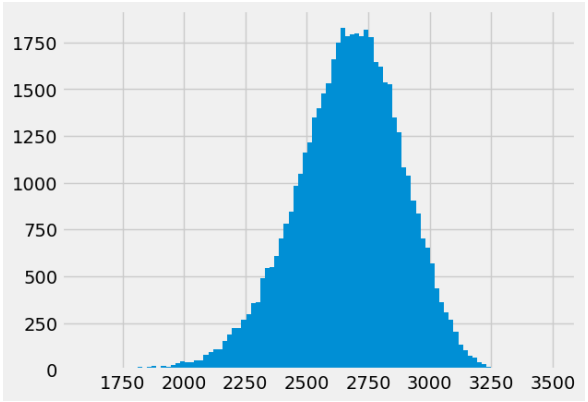
“Fixing” the fiducial cut

- Remove the APA3 selection (z end <220)
- Add fiducial cut z < 220
- Rescale end energy base on length of track in region
- Record if the interaction was true or not.

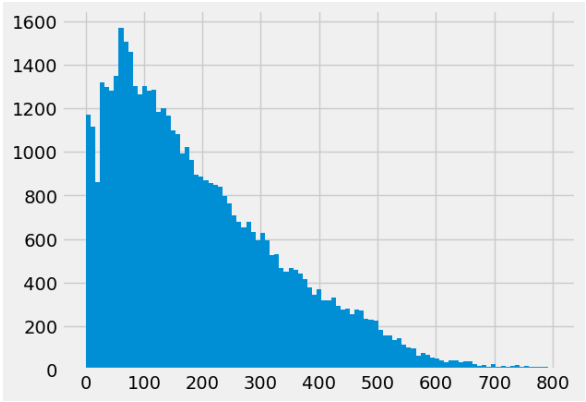
APA3 selection results



Initial energies



Interacting energies

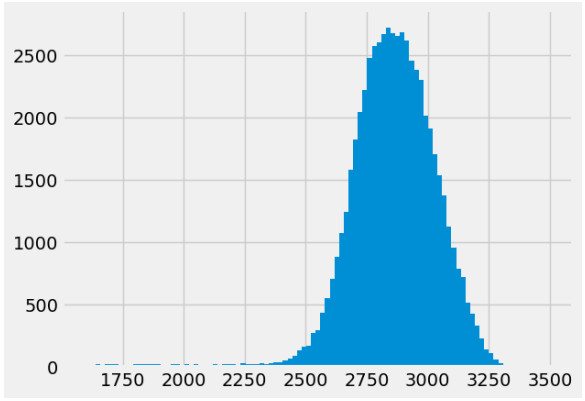


Energy loss in TPC

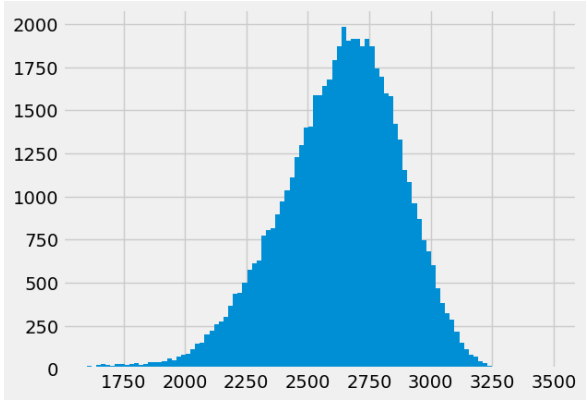
“Fixing” the fiducial cut

220cm is ~500 MeV energy loss

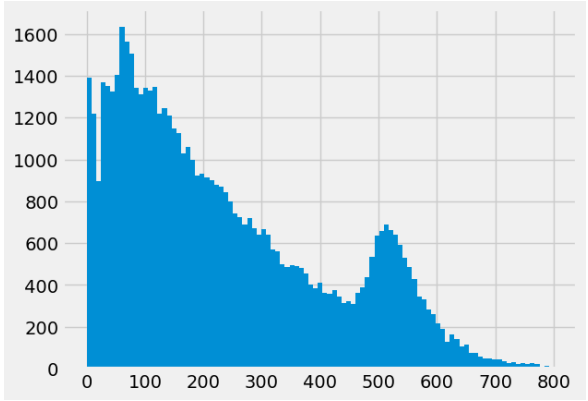
Fiducial cut results, true energies



Initial energies

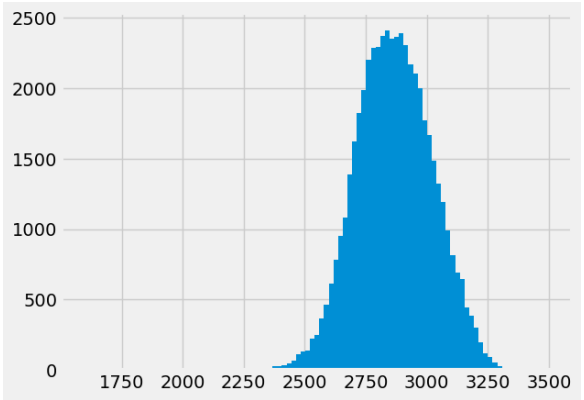


Interacting energies

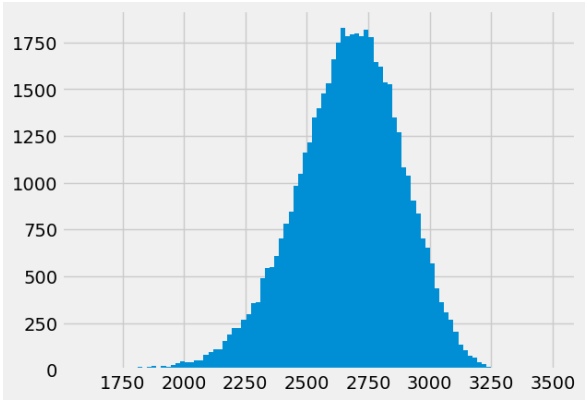


Energy loss in TPC

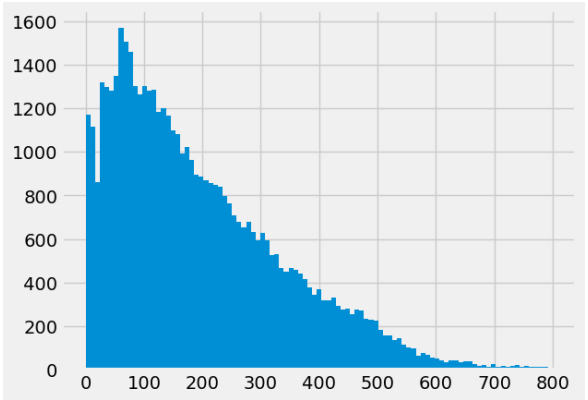
APA3 selection results, true energies



Initial energies



Interacting energies

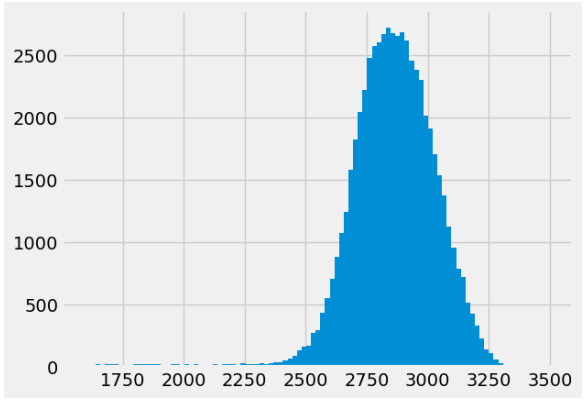


Energy loss in TPC

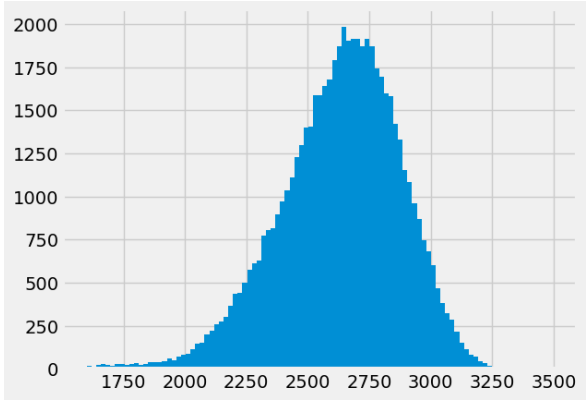
“Fixing” the fiducial cut

220cm is ~500 MeV energy loss

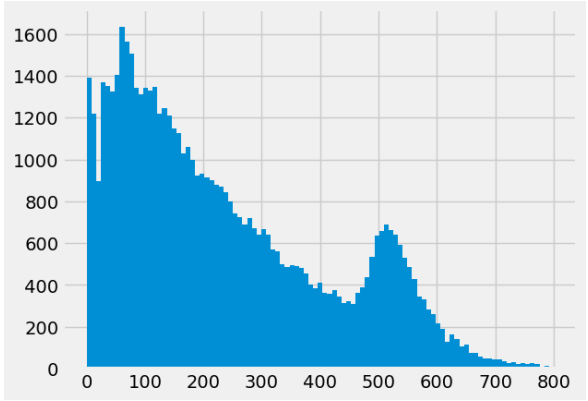
Fiducial cut results, true energies



Initial energies

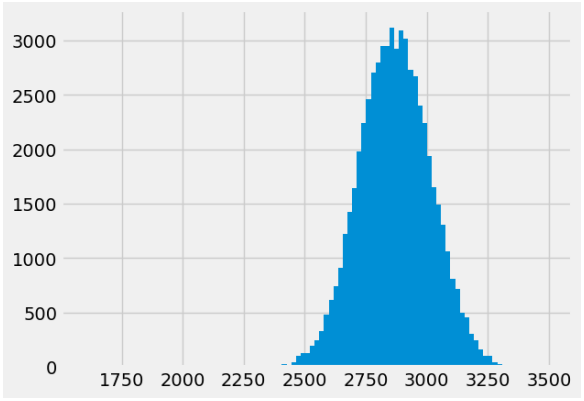


Interacting energies

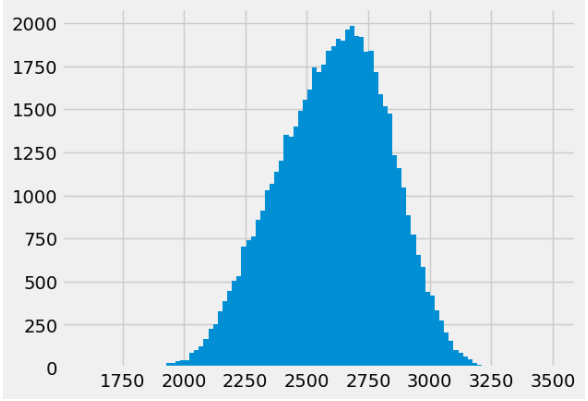


Energy loss in TPC

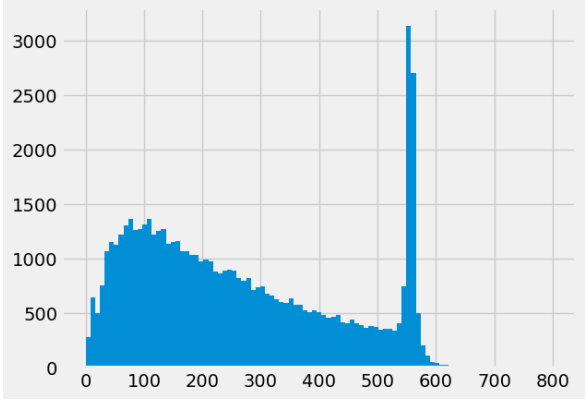
Fiducial cut results, reco energies



Initial energies



Interacting energies



Energy loss in TPC

“Fixing” the fiducial cut

- Results still fail.
- Next, run manually:
  - Pick a root file
  - Calculate cross-section from all truth
  - Step through selections/ fiducial cut to identify failure