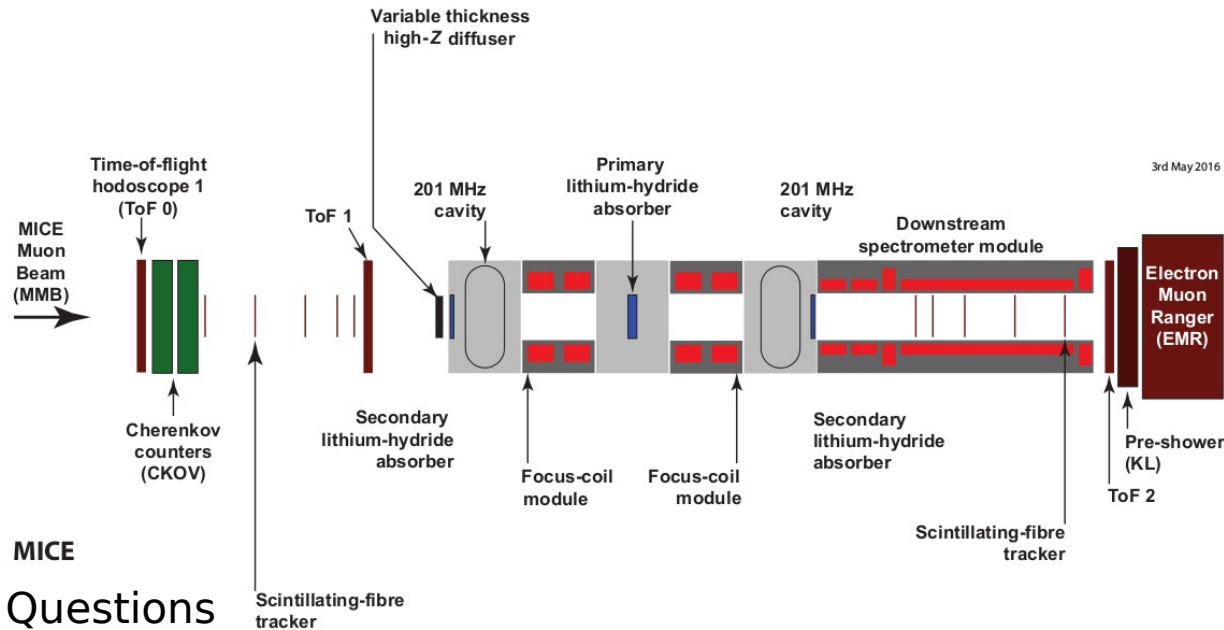
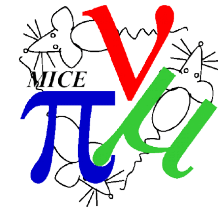


# Cooling Demo Descope Option

- Option: SS downstream

SS2 in downstream



## ■ Questions

- Can we find a viable optics to match to FCU?
  - ?
- Can we reconstruct well enough in the Quads+diffuser OR do a difference (absorber in vs out) measurement?

# Layout & Clearances

- Where should the tracker stations be placed?
- After conversation with Geoff Barber, seems 100mm spacing could be difficult
  - 200 mm is comfortable
- Some notes on upstream clearances:
  - Between Q9 & TOF1
    - There is ~1.2 m – sufficient for 4 tracker stations
  - Between TOF0 and Ckov
    - ~150 mm – can fit 1 station
    - If Ckov is moved downstream, can add another tracker station
  - Between the quads
    - Room for 1 station
    - But – do we want a tracker station there?
    - Gives a better handle on field-drift?
    - Introduces more of reconstruction fiddling when fields drift?
    - Systematics?
    - What is the gain?

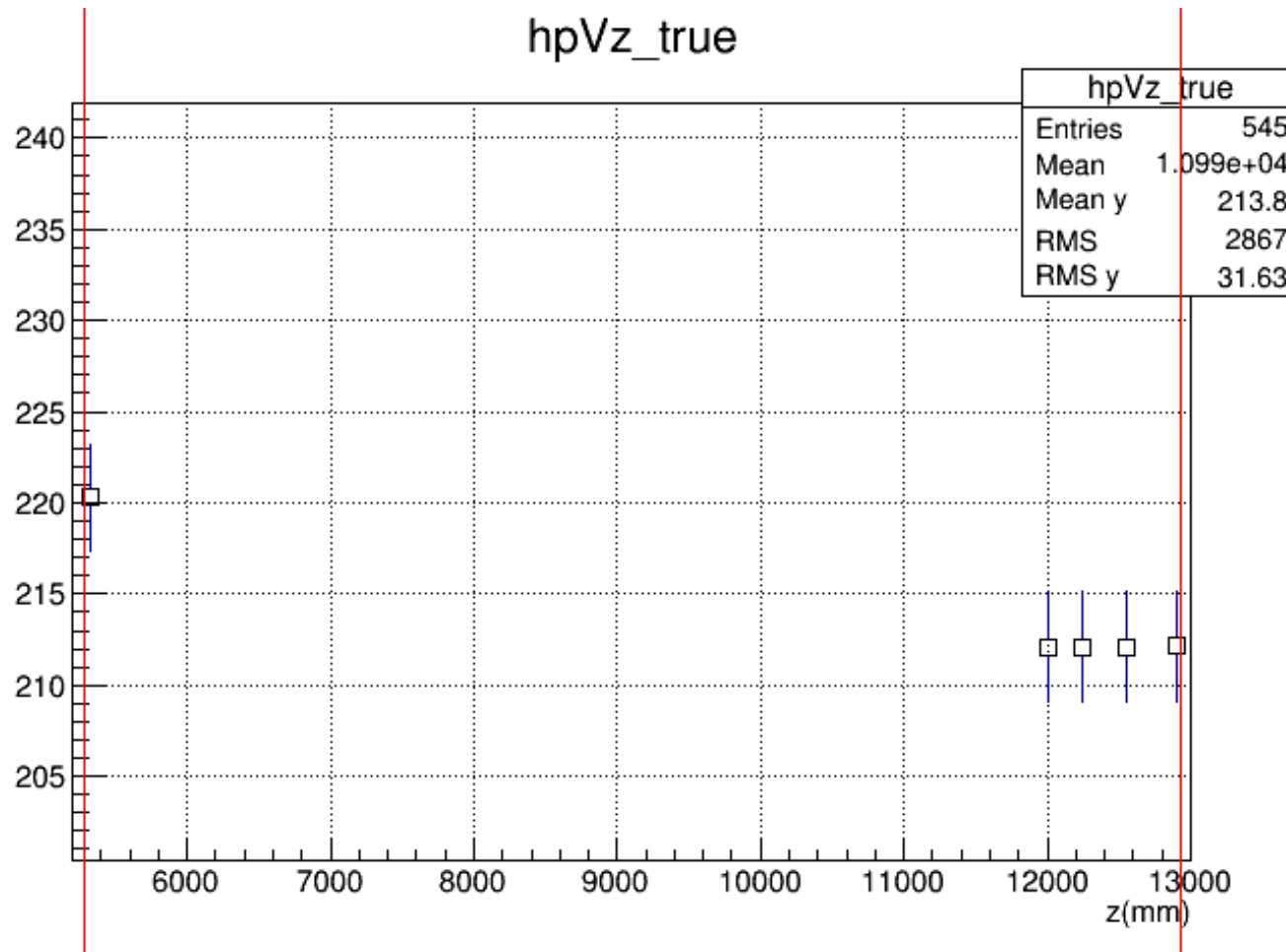
# Track Reconstruction TOF0-1

- Option 1:
  - 4 tracker stations upstream of TOF1
    - Spacing 200, 250, 300, 350 mm
  - 1 station btm of TOF0 & Ckov
    - It's a bit tight in there in the current TOF0-ckov layout
  - TOF0: 5285 mm
    - *TK0: 5320 mm*
  - Ckov1: 5647 mm, Ckov2: 6081 mm
  - Q7: 8499, Q8: 9859, Q9: 10819 mm
    - *TK1,2,3: 12000, 12250, 12550 mm*
- Option 2:
  - 2 tracker stations upstream of TOF1
  - 2 tracker stations between downstream of TOF0 & upstream of Ckov
  - Station between Q7-Q8

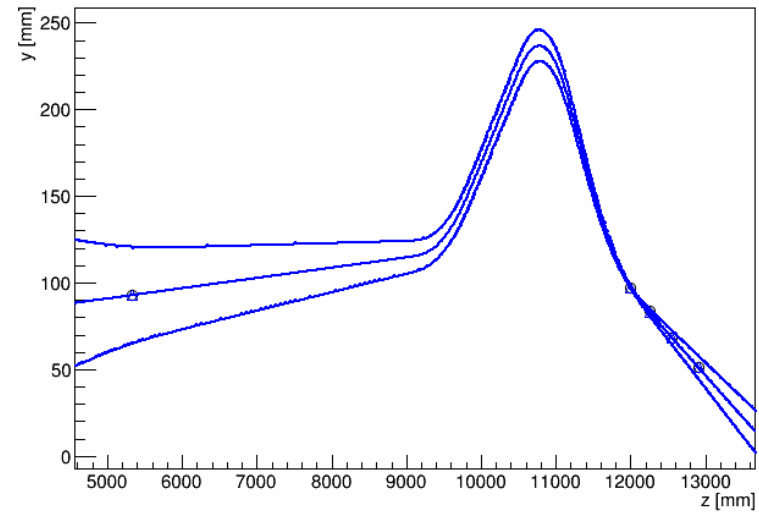
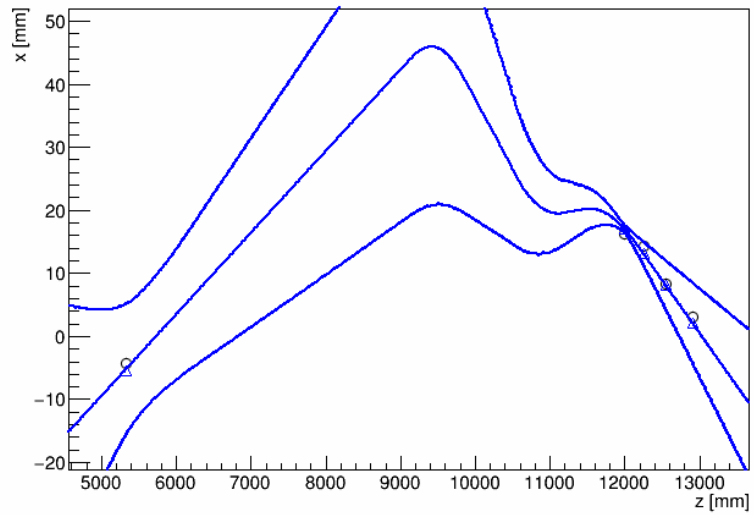
# Reconstructing TOF0-TOF1

- Virtual planes to simulate Tracker stations
  - $x, y$  smeared by tracker resolution (500  $\mu\text{m}$ )
  - Time smeared by TOF resolution (70 ps)
  - Propagate errors & fit  $x, y, t$
  - Energy loss & scattering in material accounted for
- Code:
  - From Rogers: GlobalErrorTracking & Minuit-fitter
- 3-200 G4BL input
- Takes a long time to track & fit

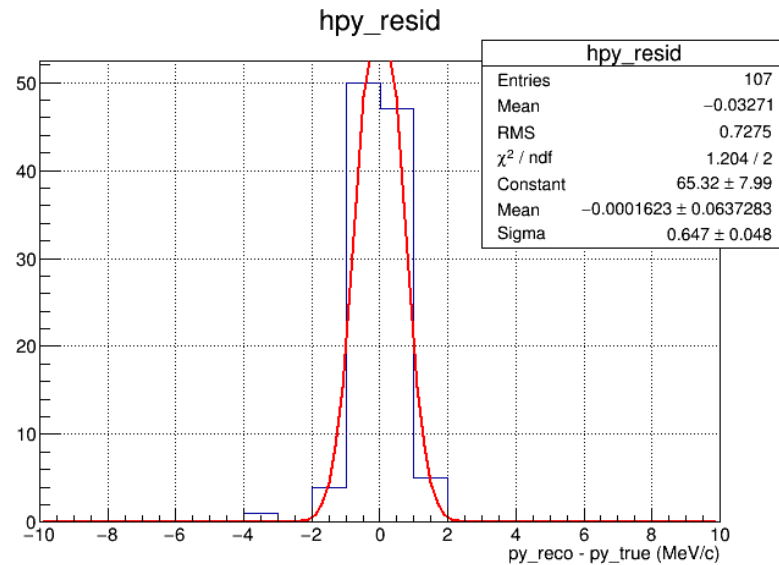
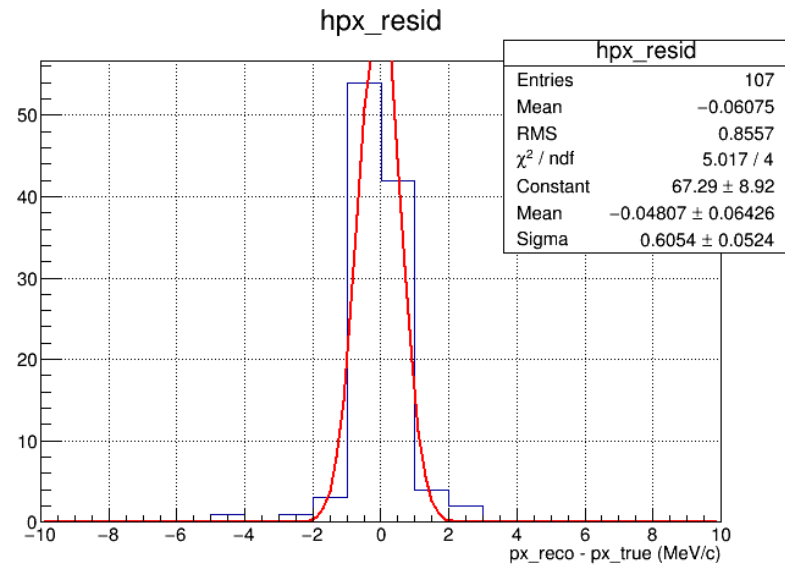
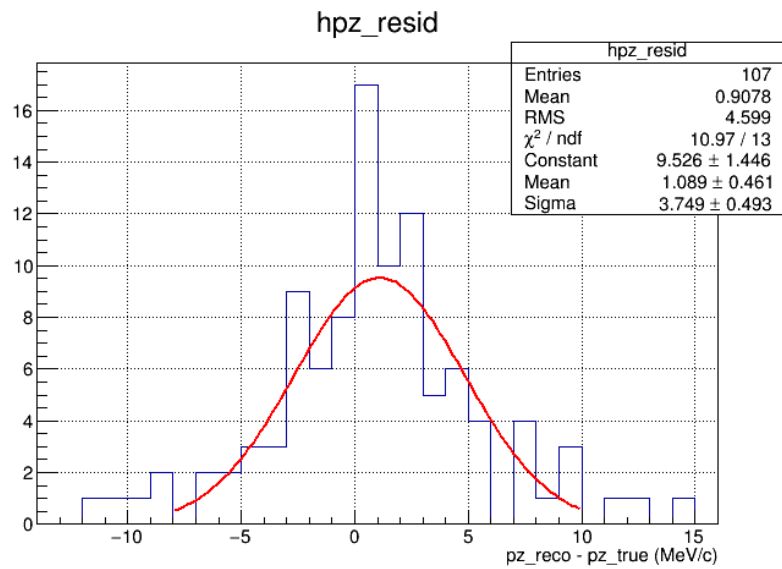
# Reconstructing TOF0-TOF1



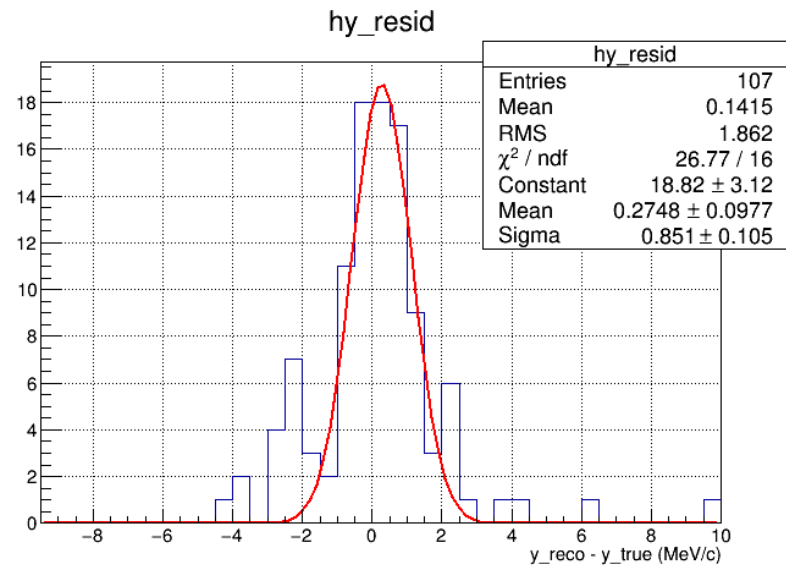
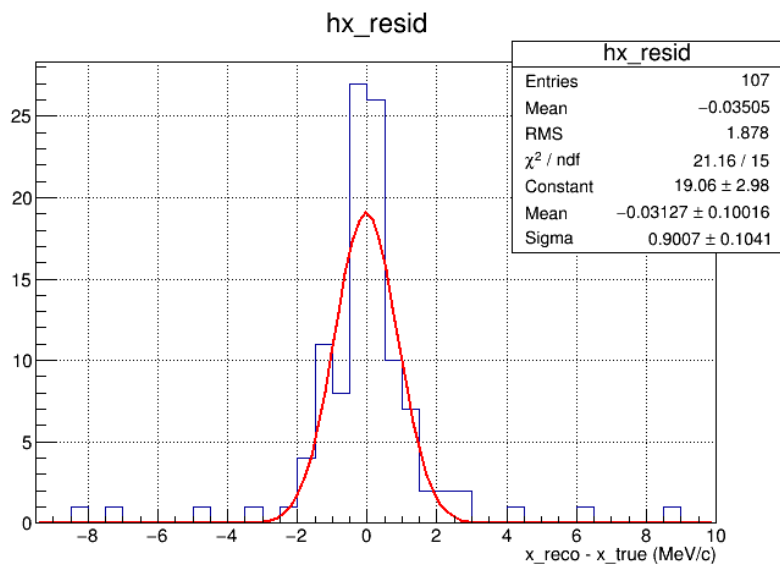
# Reconstructing TOF0-TOF1



# Reconstructing TOF0-TOF1



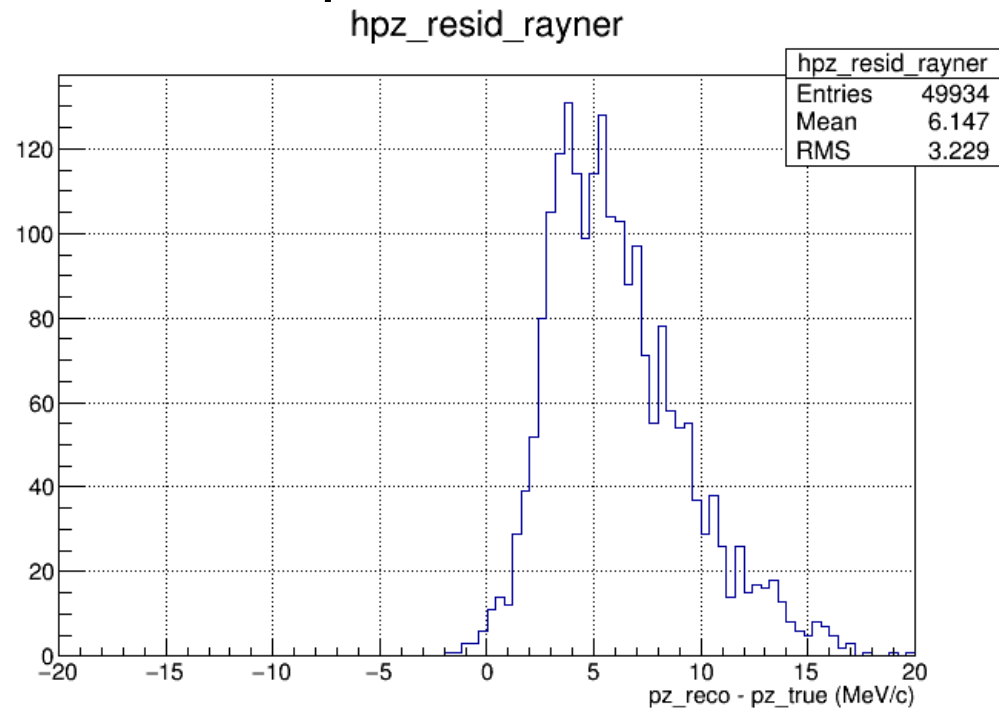
# Reconstructing TOF0-TOF1





# Reconstructing TOF0-TOF1

- Tried Mark Rayner's transfer-matrix-based reconstruction
  - Modified to include momentum loss estimate due to  $ckov$
  - Take smeared positions nearest to TOF0 & 1



# In progress

- Issue with Q8 position in geometry,
  - Need to fix & re-run tracking
- Checking stability of fits
- Running option 2
  - TOF0-x-x | Q7-x-Q8 | x-x-TOF1
- Reconstruction downstream of TOF1
  - This is potentially the most problematic one because of the diffuser
  - We can add 2 tracker stations downstream of the diffuser