Beam Transport Update

Previously

- Looked at first order (5 x 5) and second order (20 x20) HRS Optics

- Saw that the data was sensitive to second order effects

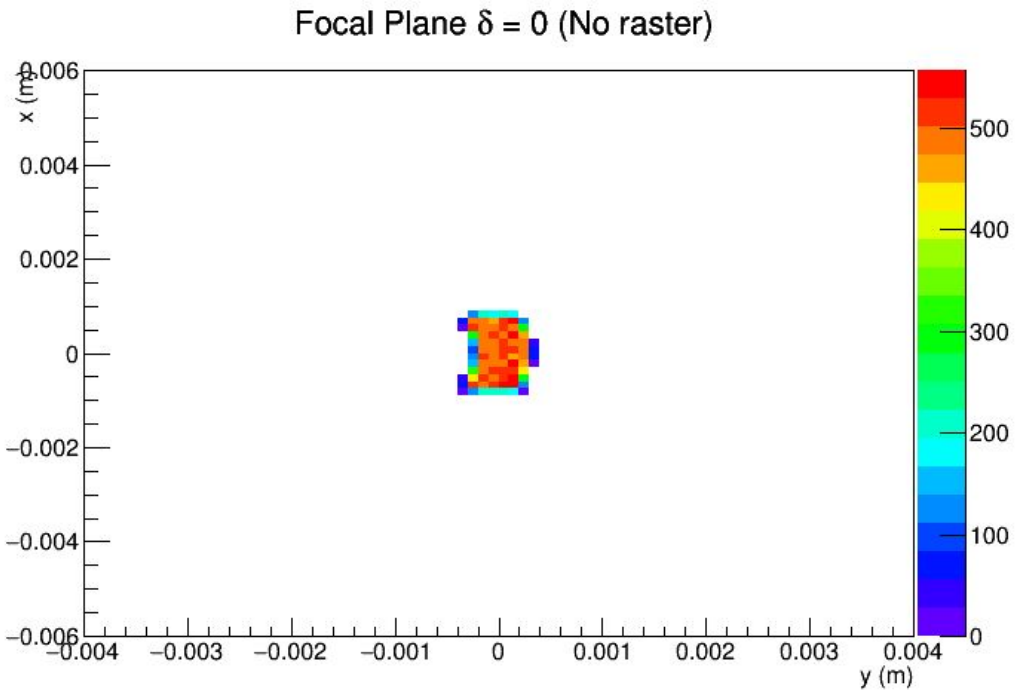
- Issues with first order plots at focal plane detector(didn’t vary linearly)

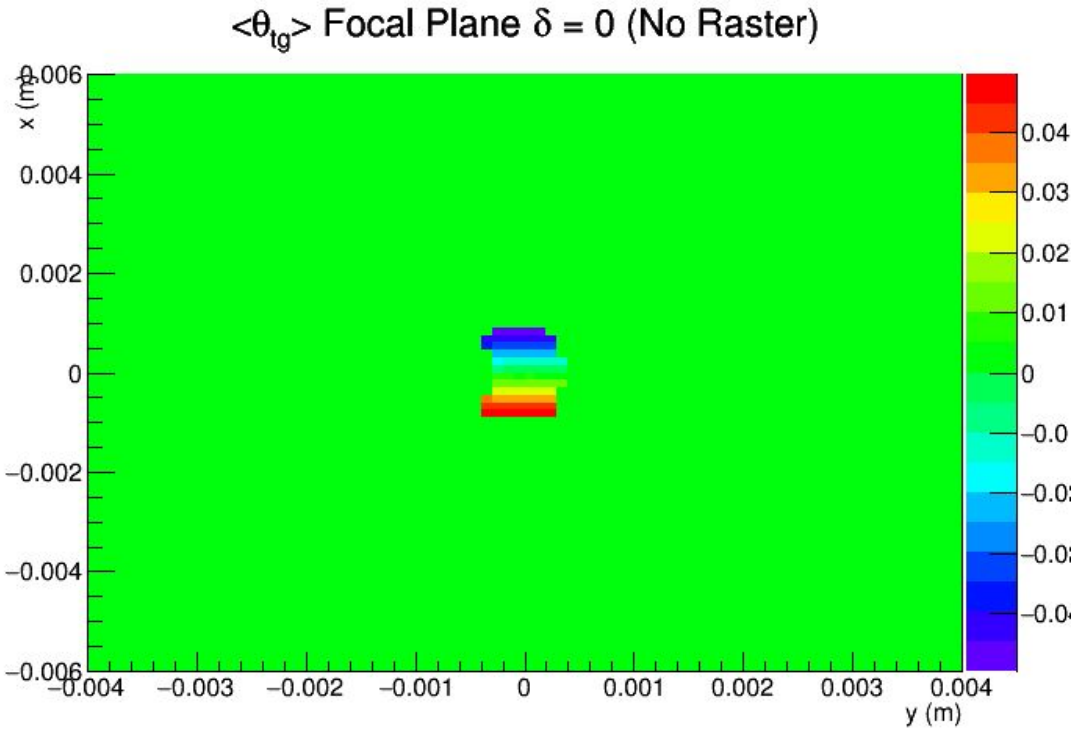
Currently

- Looking at first order (5 x 5) and second order (20 x20) HRS optics
- Exploring issue with first order plots (looking at 1D and 2D projections onto focal plane with and without raster)
- Retuning HRS
- Looking into second order effects in the HRS (data with and without sieve)
- Simulating septum mistune by adding a temporary delta vector in the HRS chain

1st Order Optics

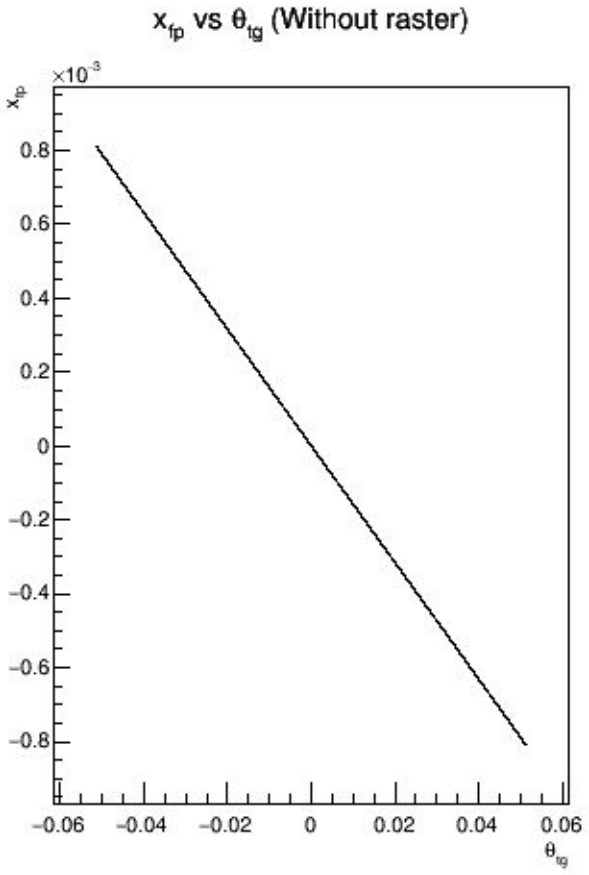
Focal Plane (1st Order No raster)

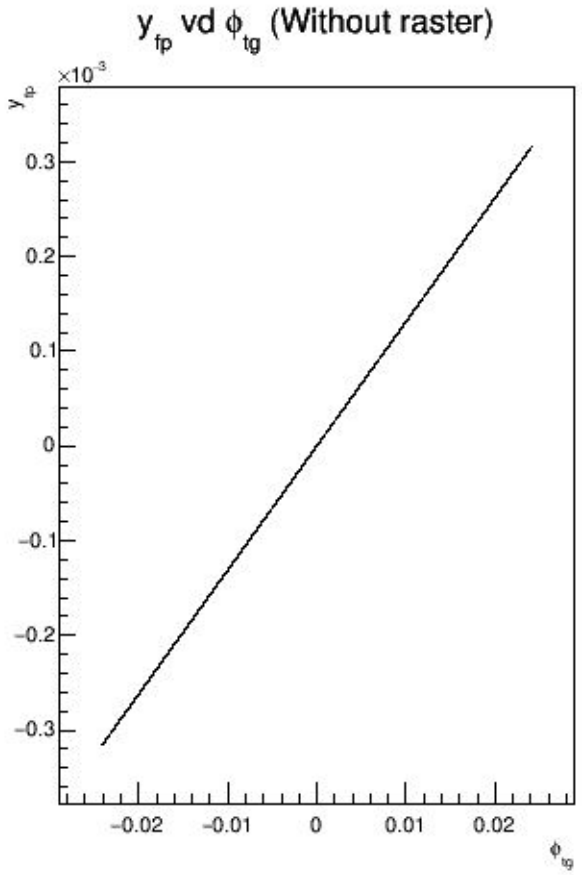




- Enforced the collimator cut which fixed the distribution at the focal plane.
- Linear relationship between focal x_{fp} and θ_{tg}

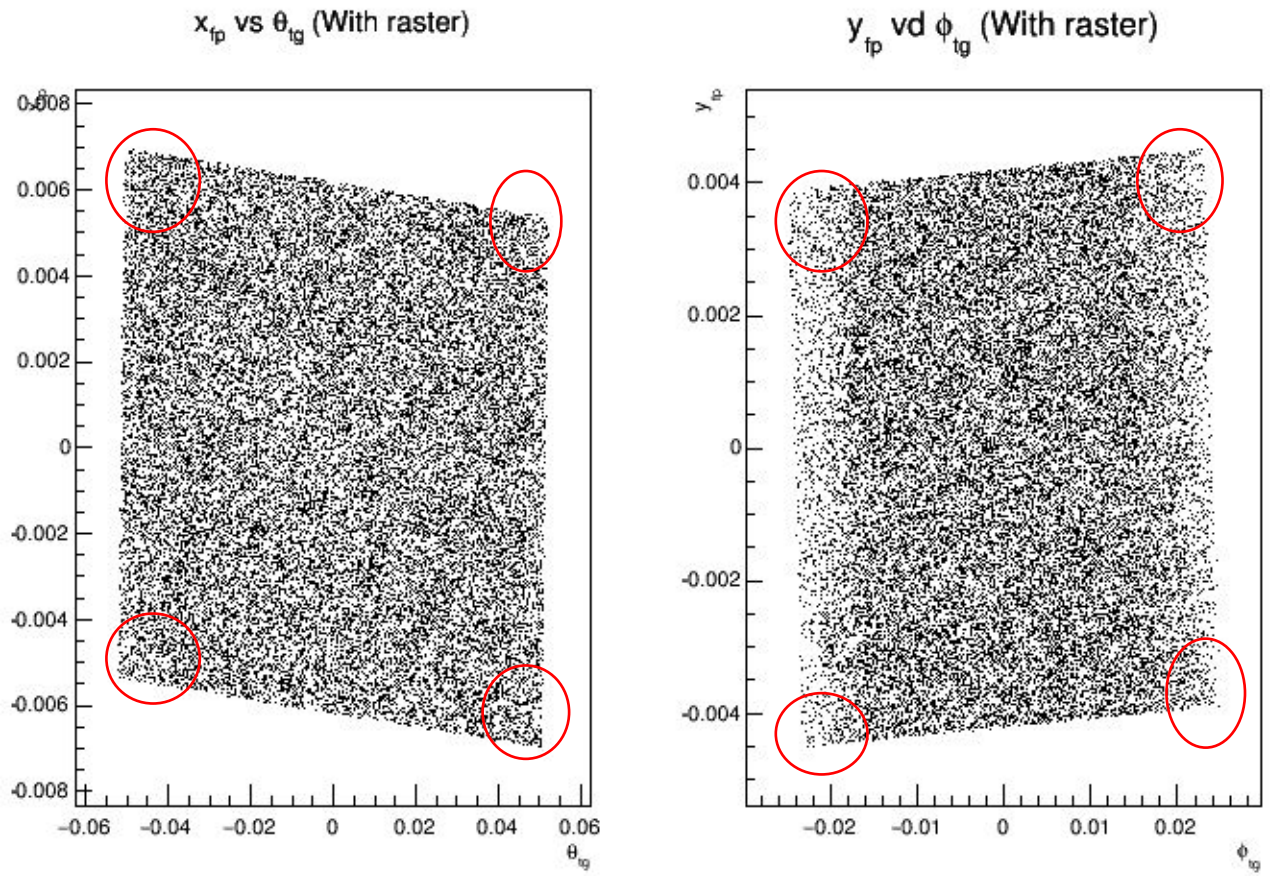
1D Projections (Without Raster)





- 1D plots of x,y_{fp} vs θ,φ_{tg}
- Target variable range have collimator cut enforced

2D Projections (Raster Included)

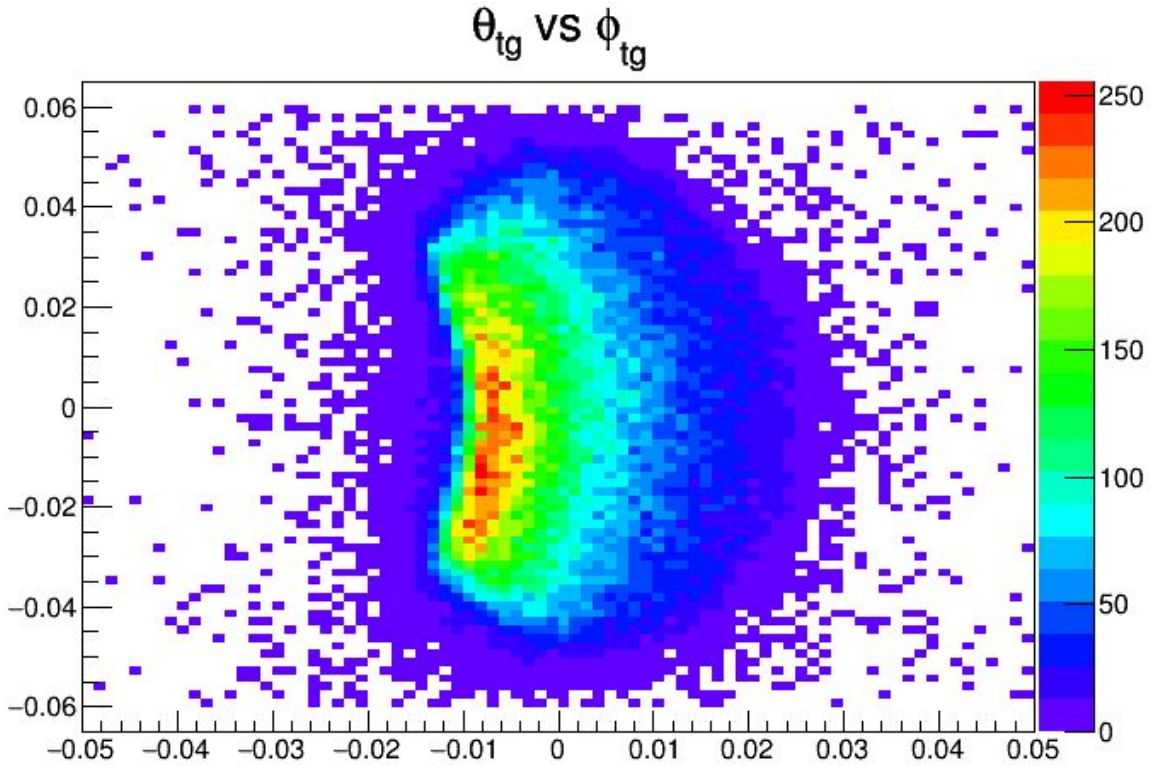


More sensitive to raster effects

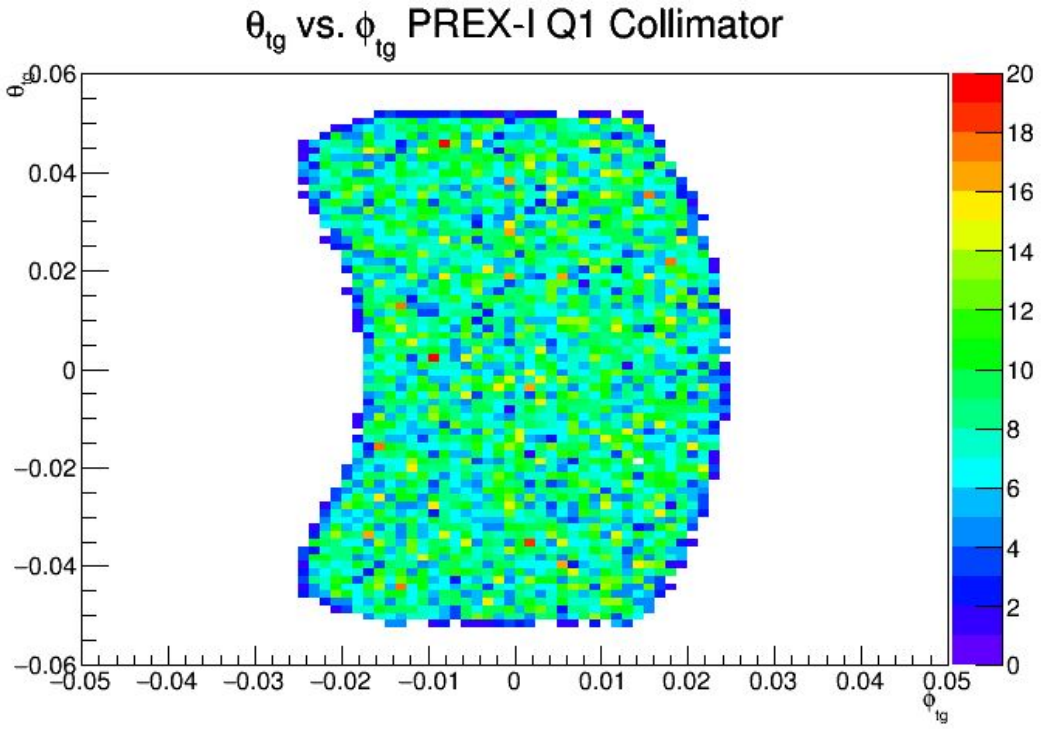
2^{nd} Order Optics

Angular Phase Space

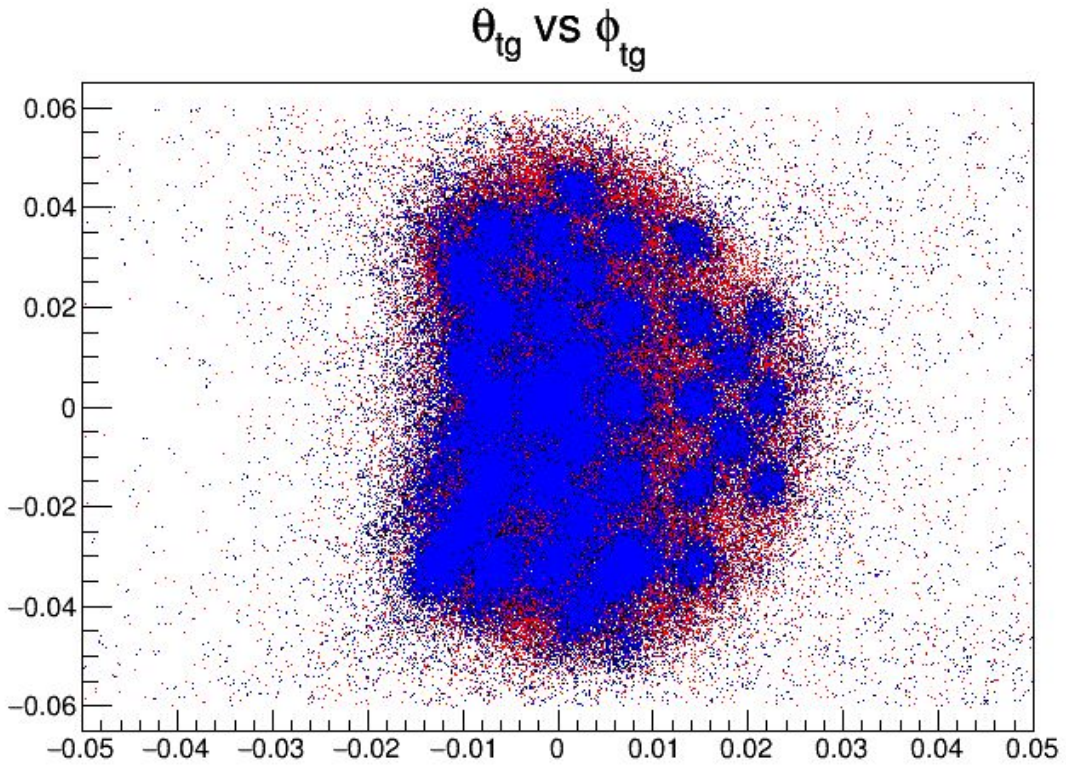
Data

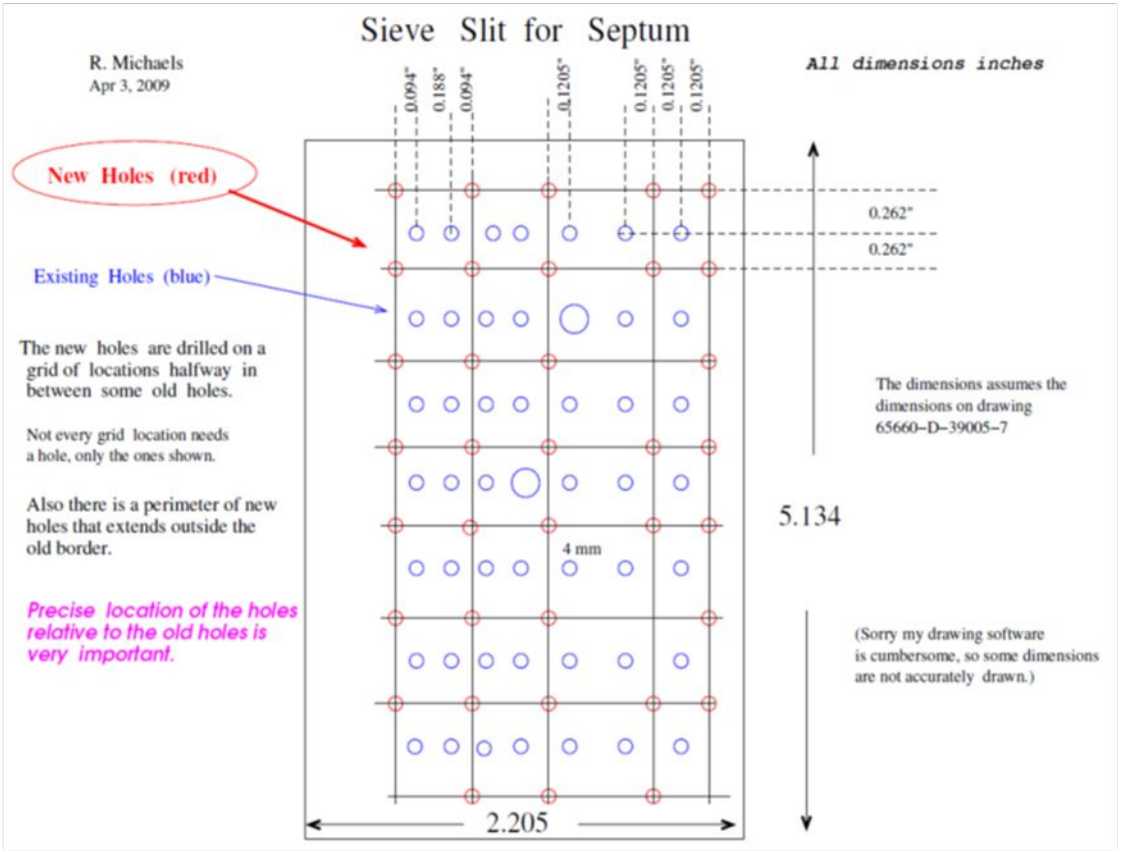


Optics Code



Sieve Data

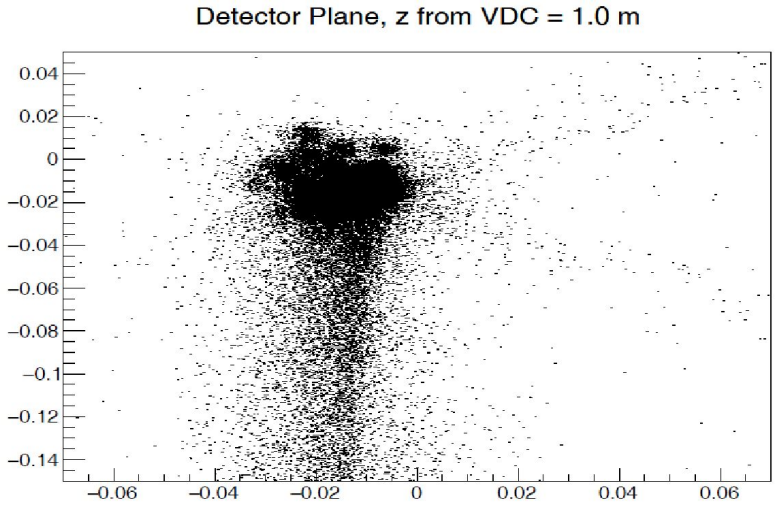


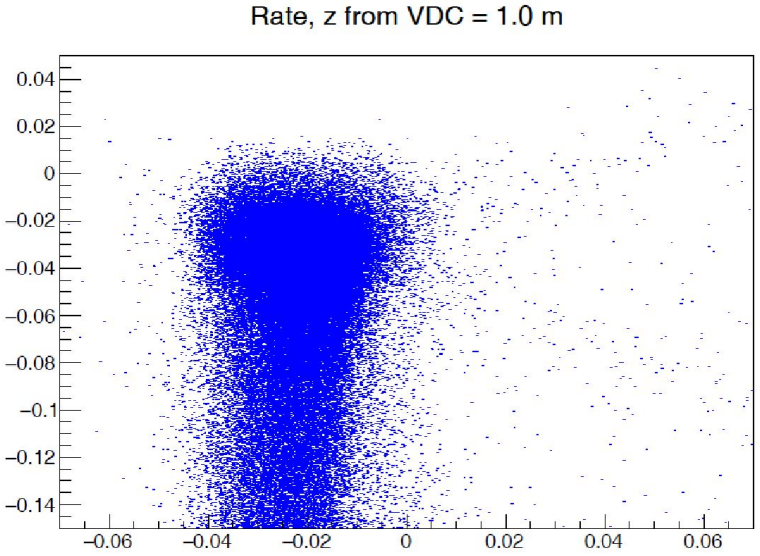


Sieve Data (no raster, thin ^{12}C target) Sieve Out Data (^{208}Pb target)

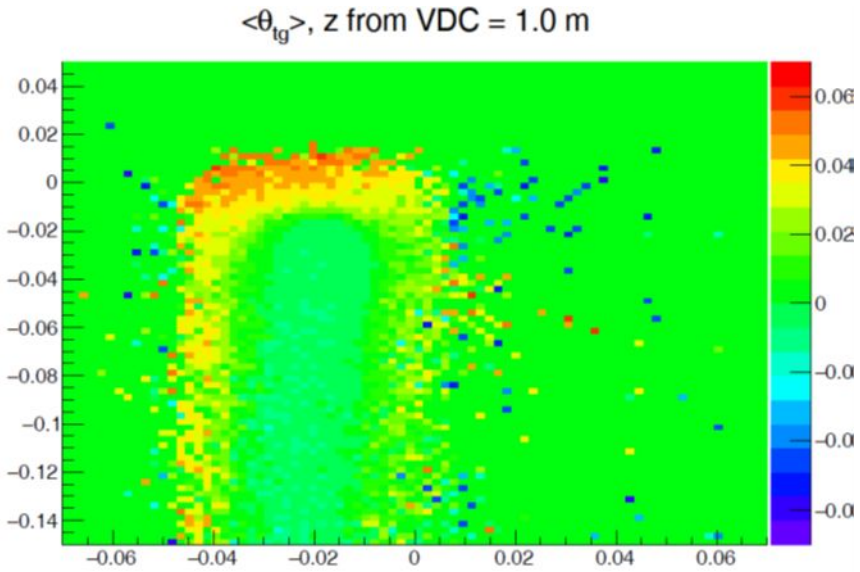
Data (With/Without Sieve Focal Plane)

Sieve in



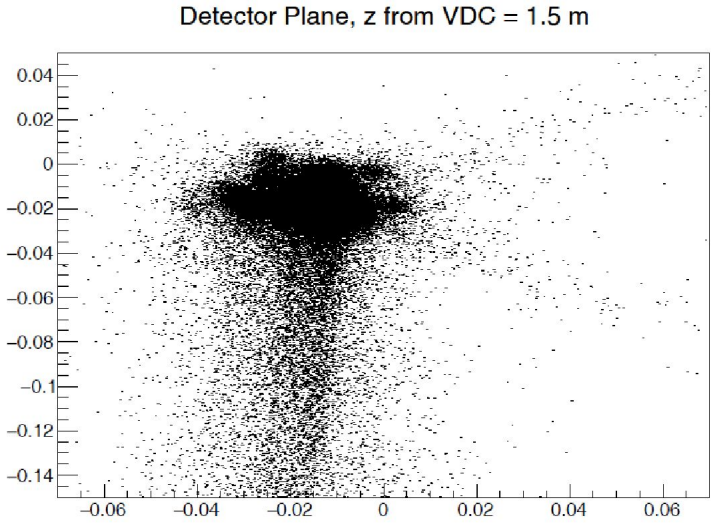


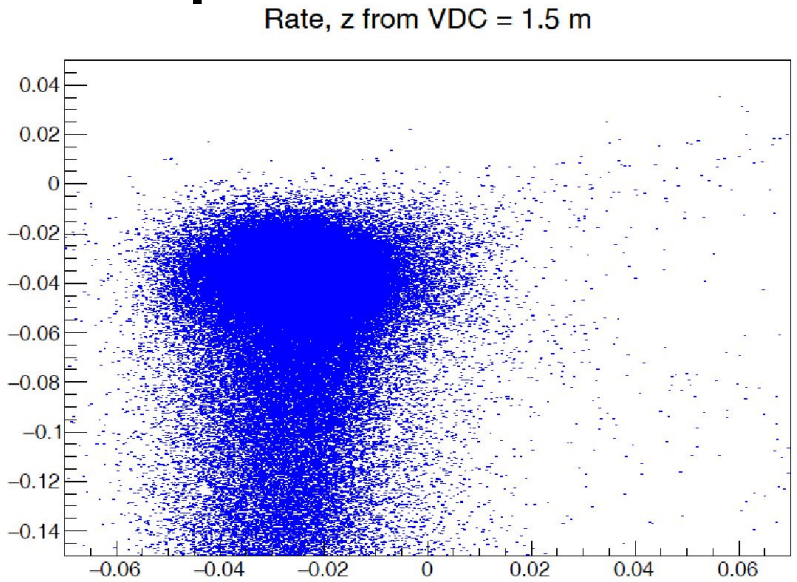
Sieve out

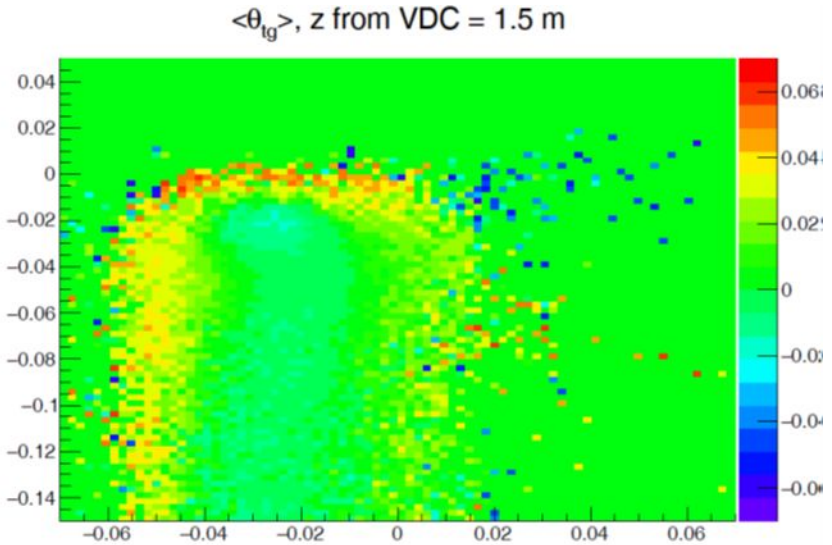


- Exploring to see if there are sieve holes that match where the A_T enhancement shows.
- Position difference on vertical axis
- Looked at recoil energy different targets and corresponding position shift (~6mm difference)
- Looking into energy losses due to ionization

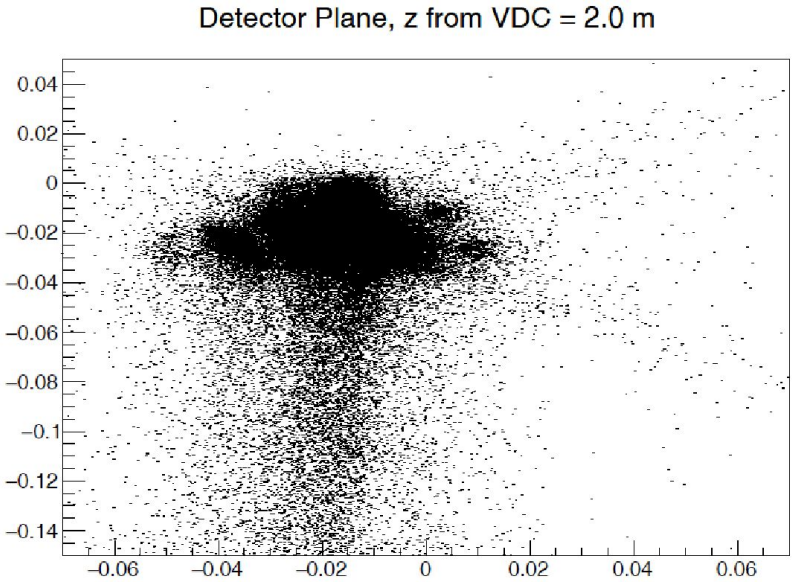
Data 0.5m downstream focal plane

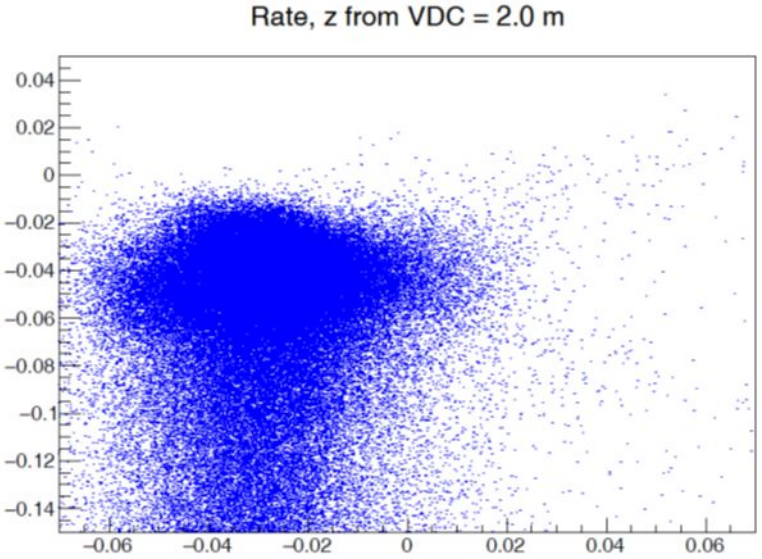


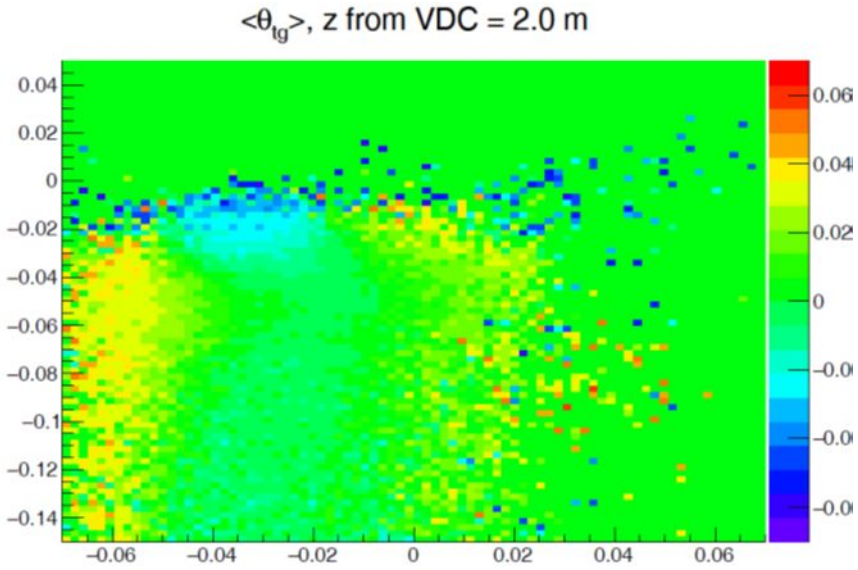




Data 1.0m downstream



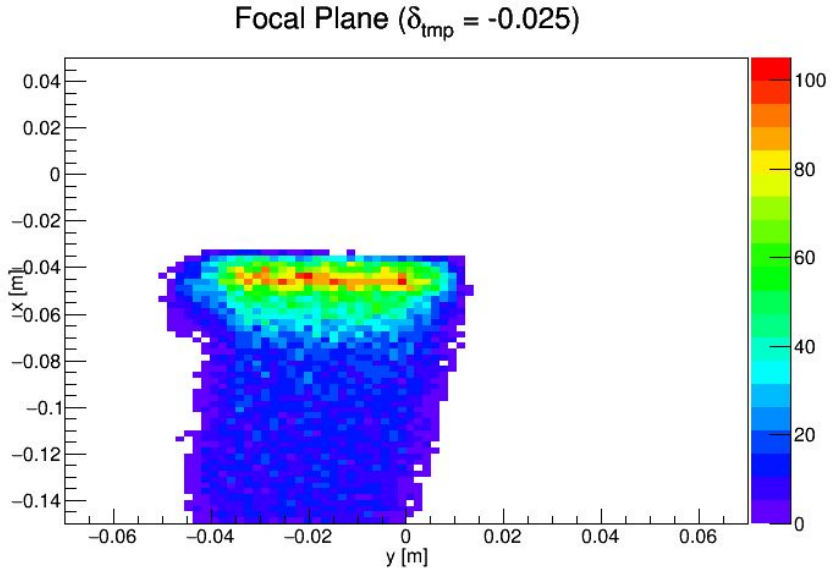


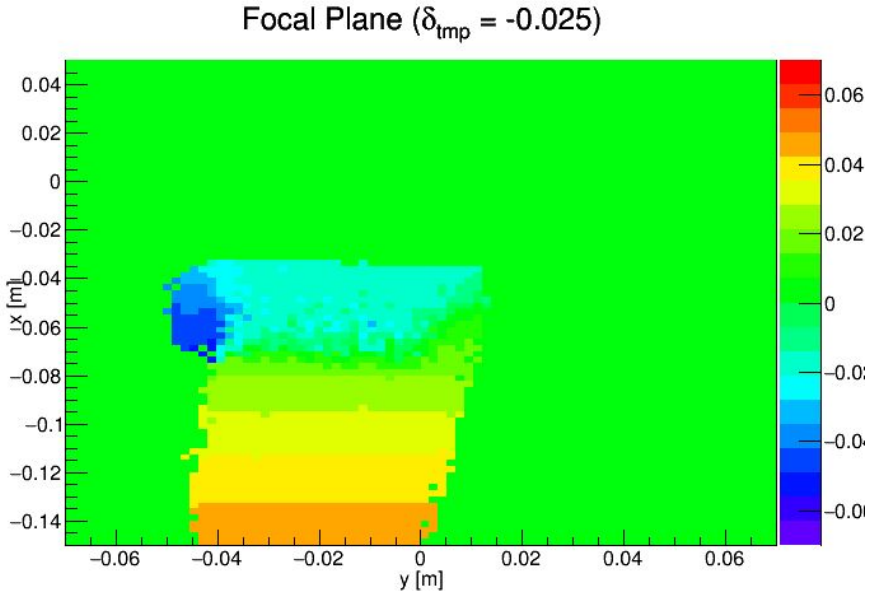


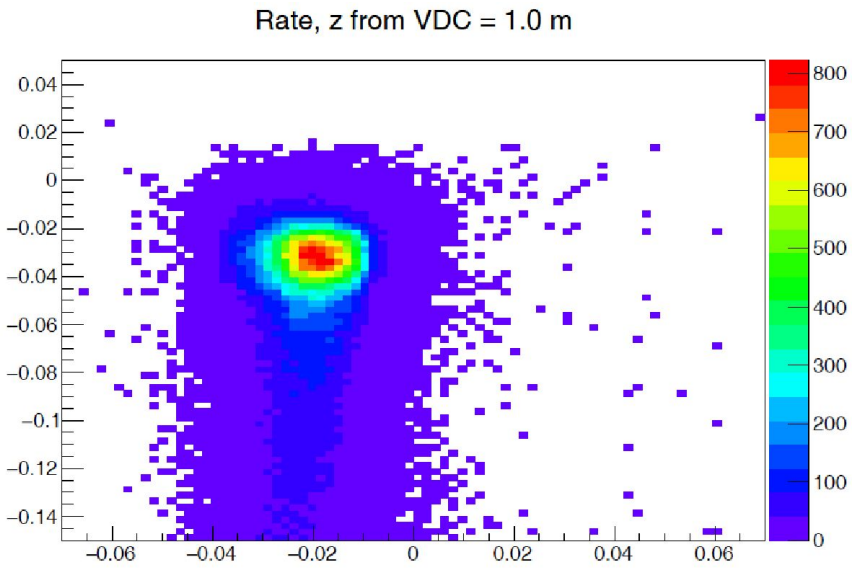
Septum Mistune

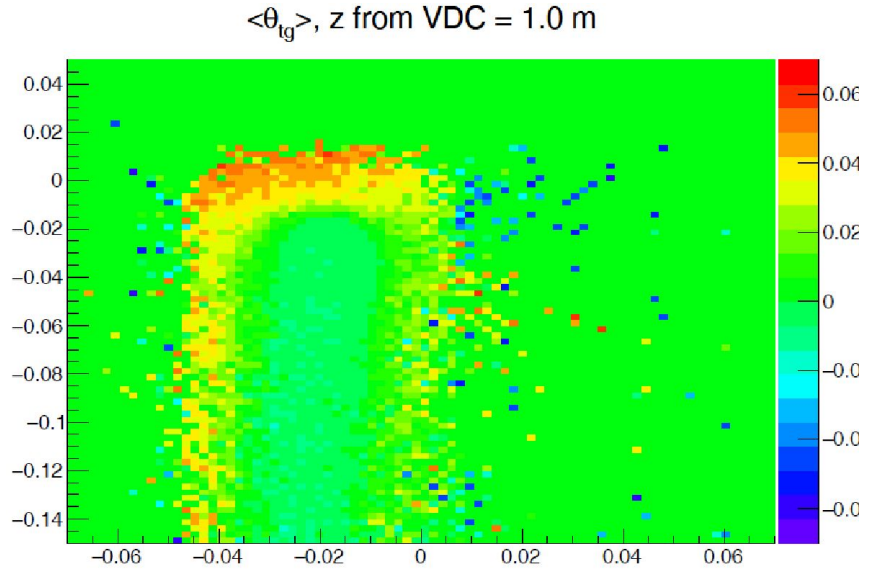
- Began looking into mistuning the septum by adding a temporary delta to the HRS chain
- Looking at 2nd order effects (still with raster on)
- Used δ_{temp} = -0.025 (wanted to exaggerate the mistune)
- Implemented cuts in the detector planes

Focal Plane Simulation and Data

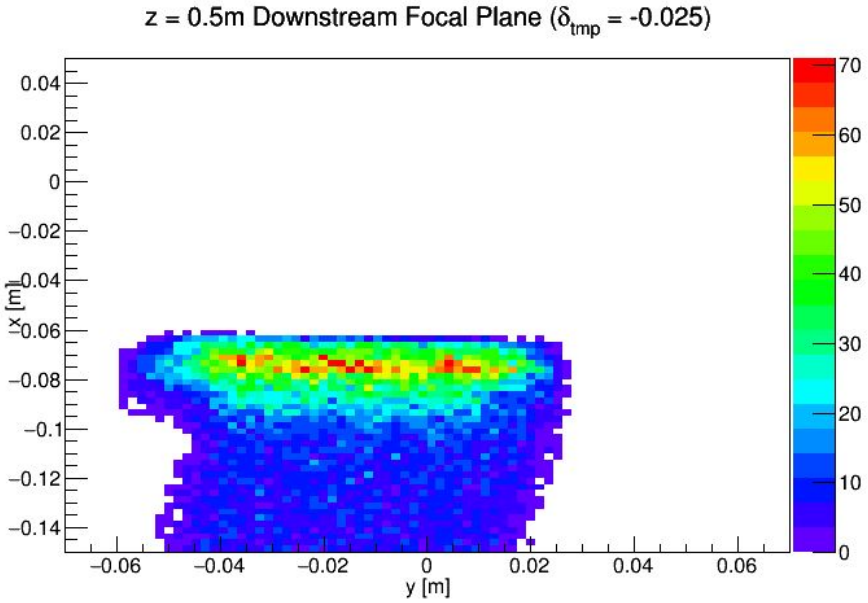


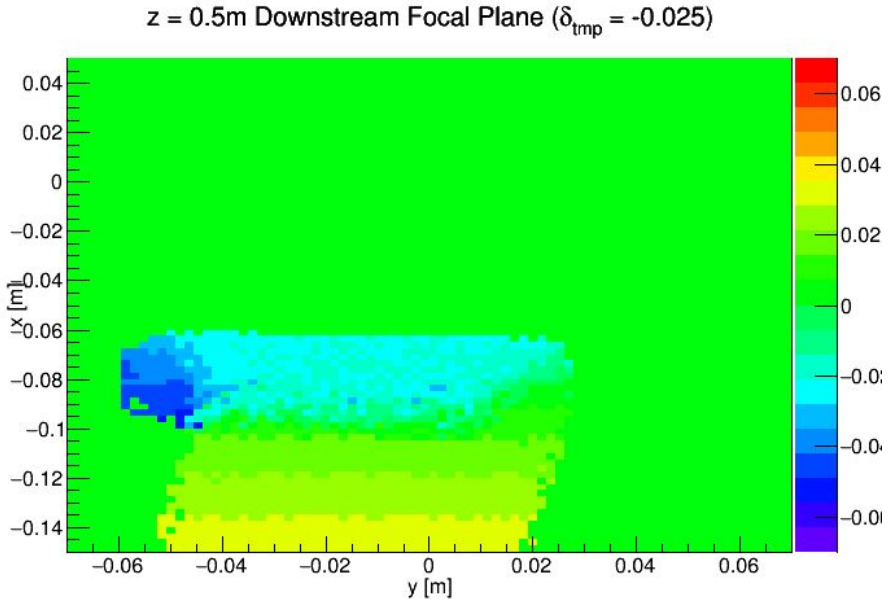


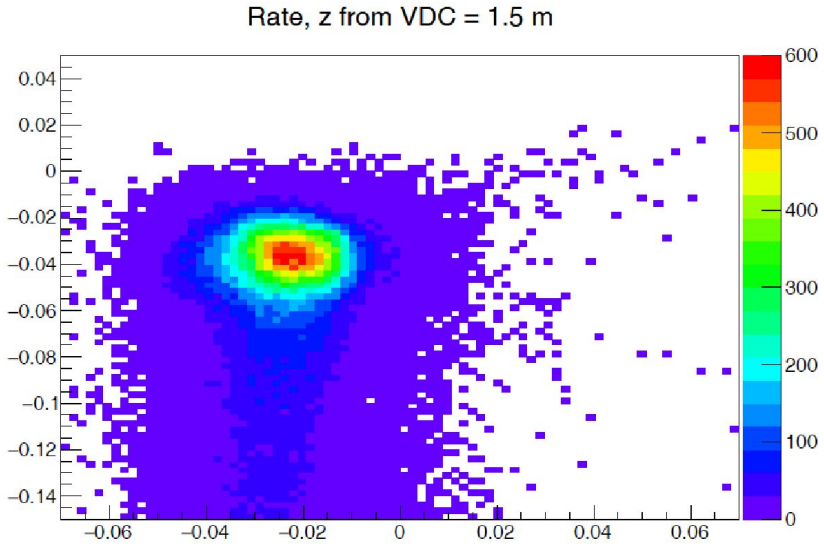


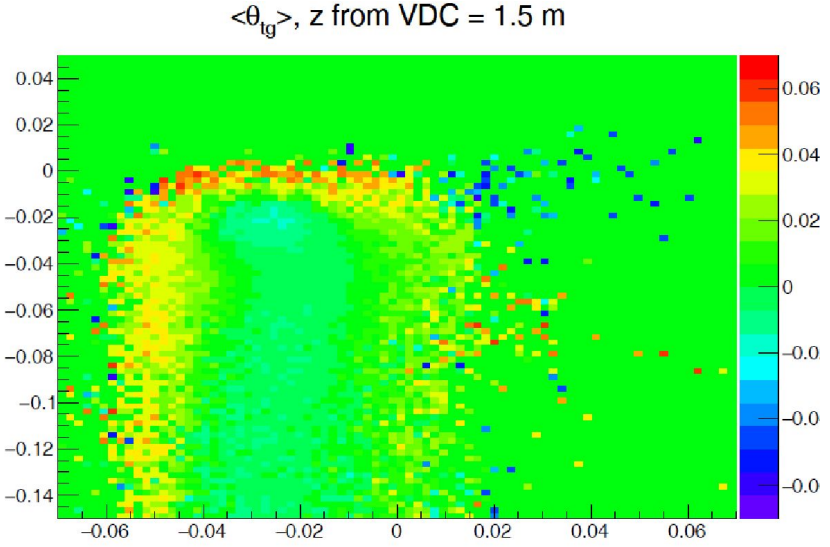


z = 0.5 m Downstream Focal Plane Simulation









z = 1.0 m Downstream Focal Plane Simulation