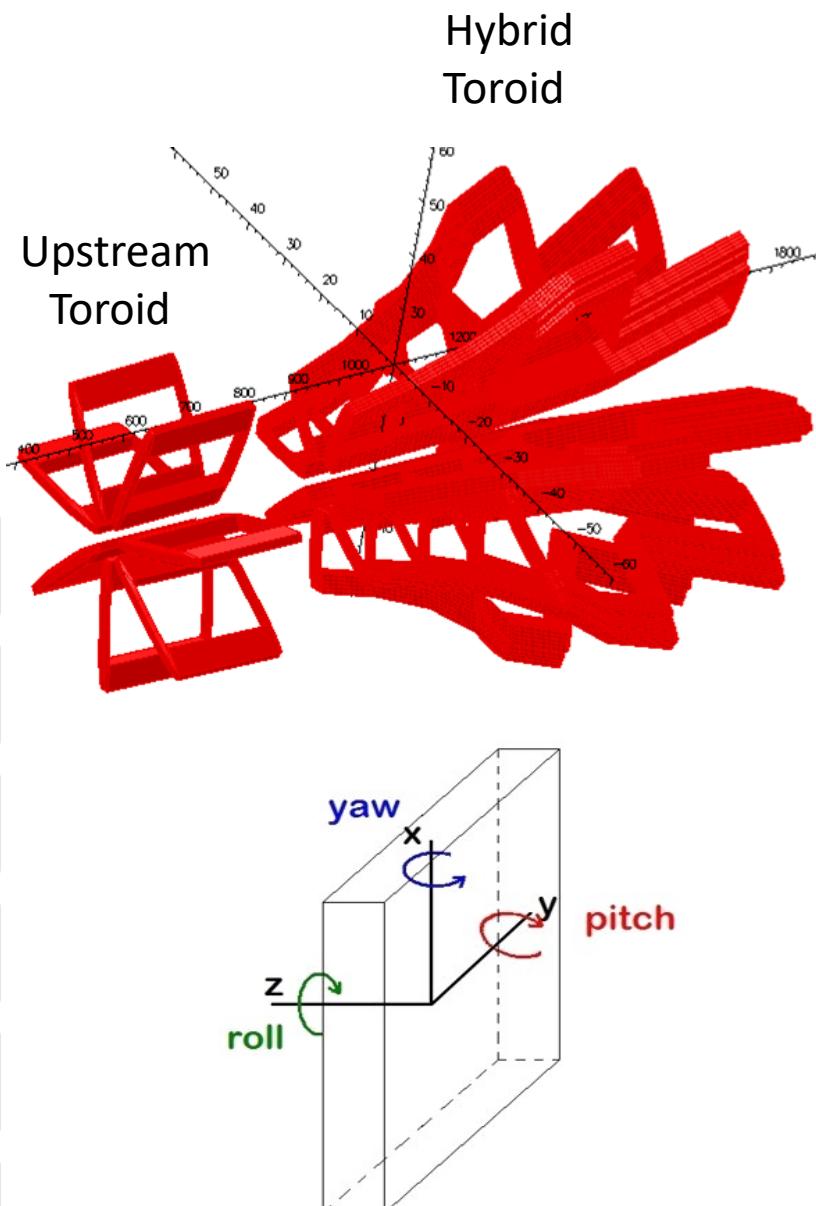
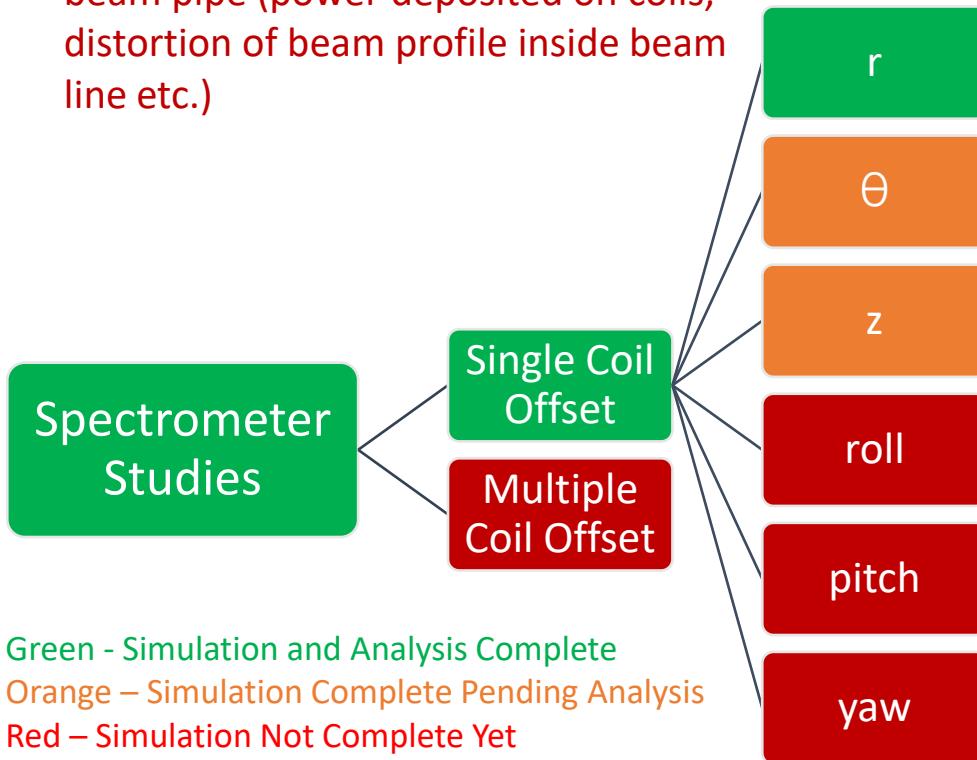


# Spectrometer Studies Update

Sakib Rahman

# Spectrometer

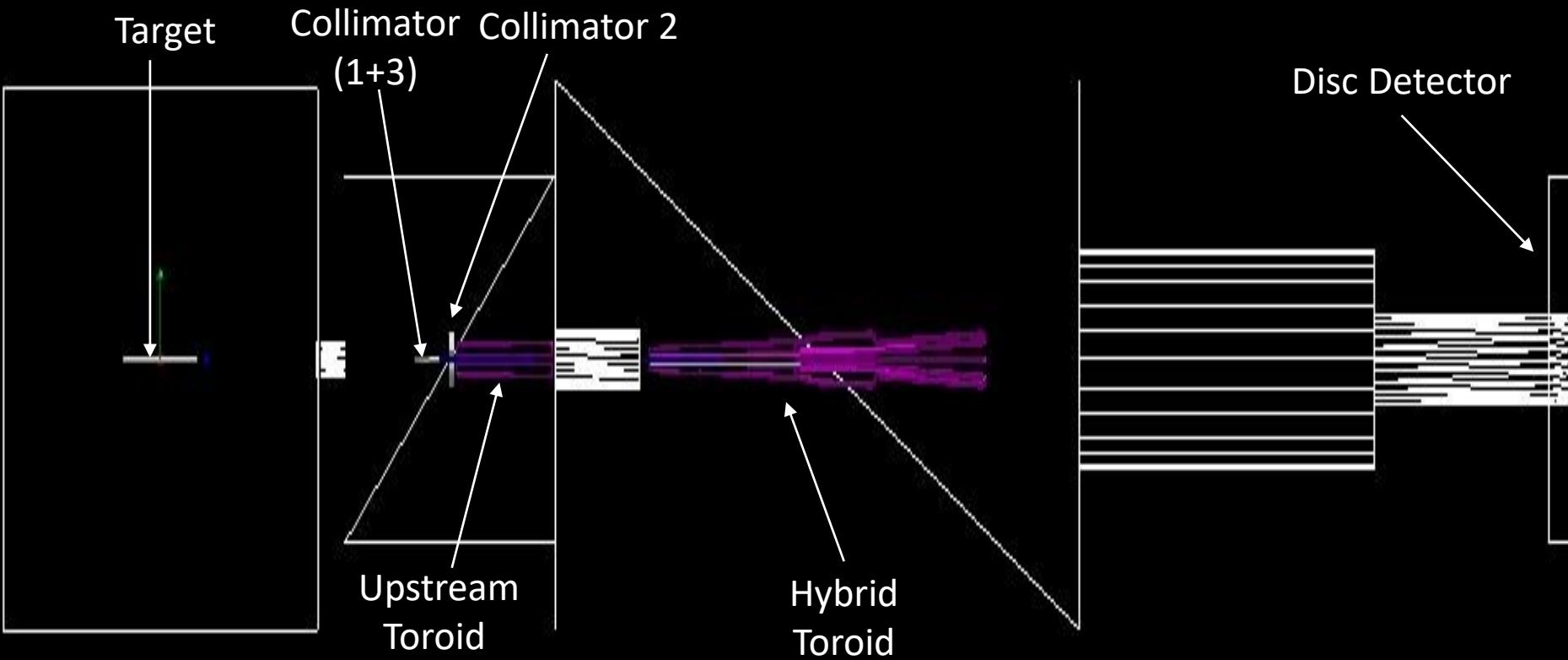
- Sensitivity Studies
  - Use allowed uncertainty in **rate**, **asymmetry**,  $\theta_{\text{lab}}$  and  $\theta_{\text{com}}$  to estimate how much spectrometer coils can deviate from their default position
- Beam Steering Studies
  - Effect of coil movement on beam inside beam pipe (power deposited on coils, distortion of beam profile inside beam line etc.)



# Geometry and Simulation Settings

## Single Coil Sensitivity Studies

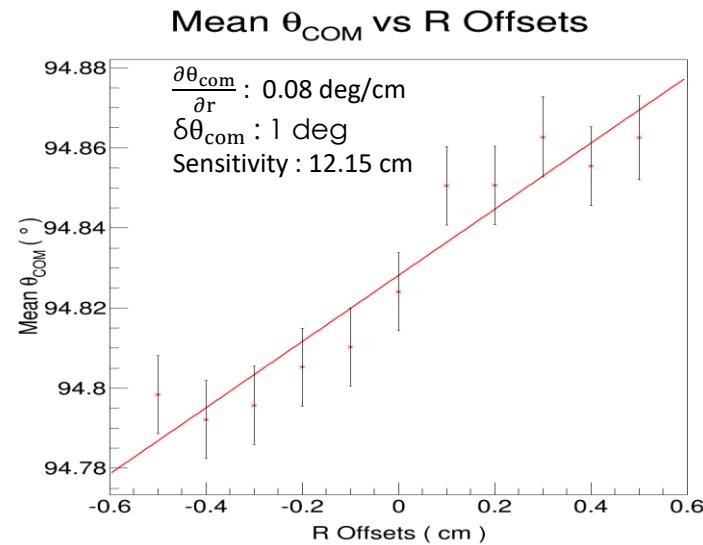
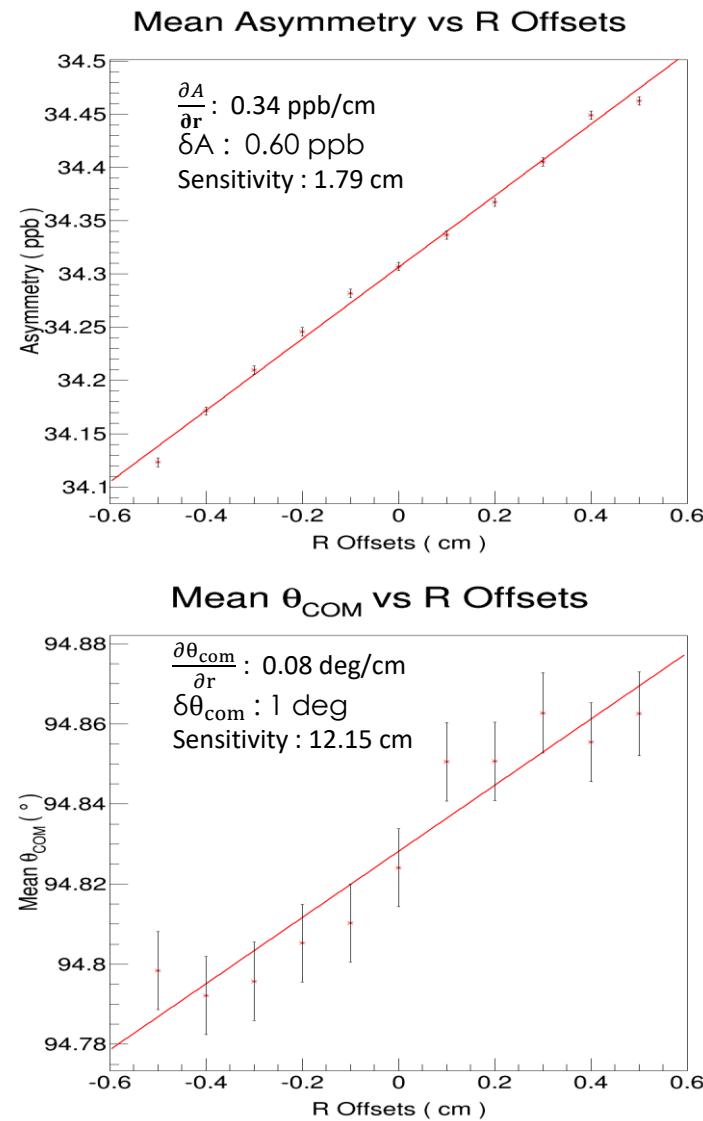
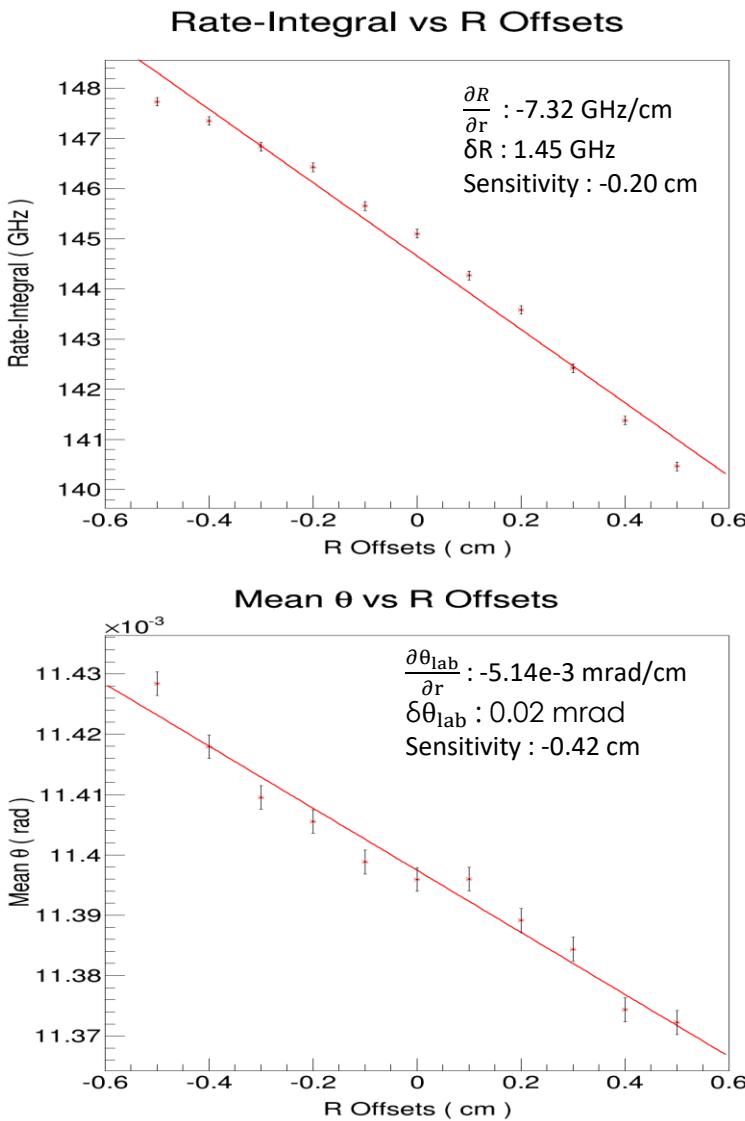
- For each Toroid, 6 different offsets with 11 different offset values ( $2 \times 6 \times 11 = 132$  unique magnetic field configurations).
- 10 million events for each configuration.
- Stripped all shielding and downstream collimators from default geometry.



# Hybrid Spectrometer

Single Coil Sensitivity to Radial Offset (ee generator)

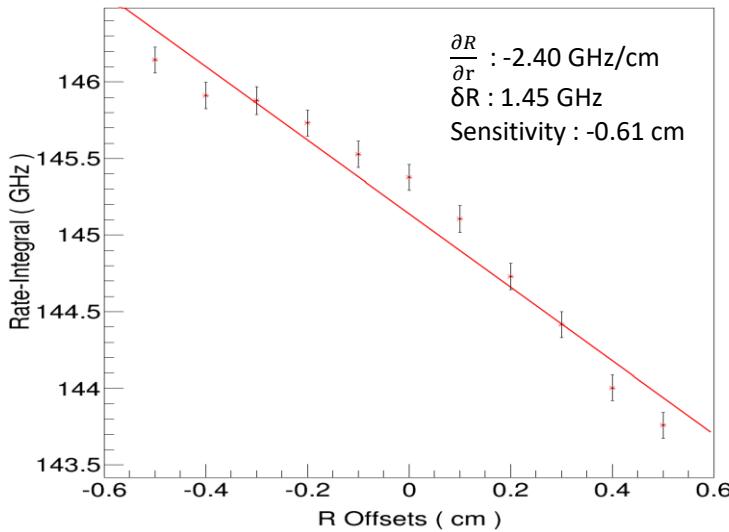
Sensitivity=Slope x Allowed Uncertainty



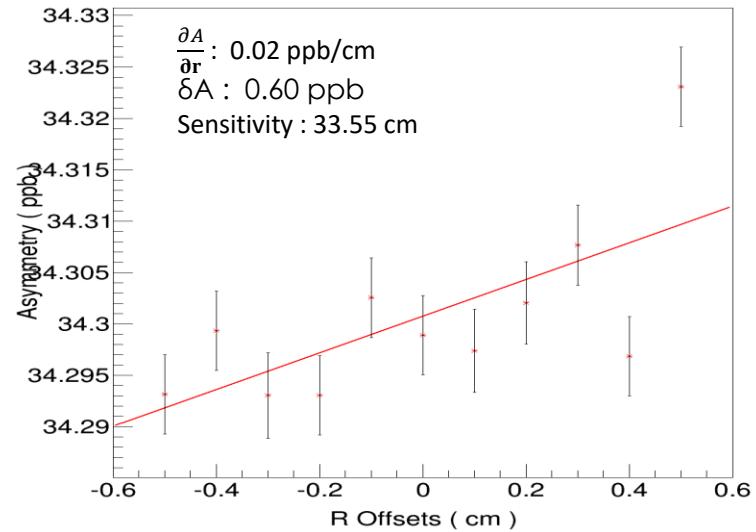
# Upstream Spectrometer

Single Coil Sensitivity to Radial Offset (ee generator)

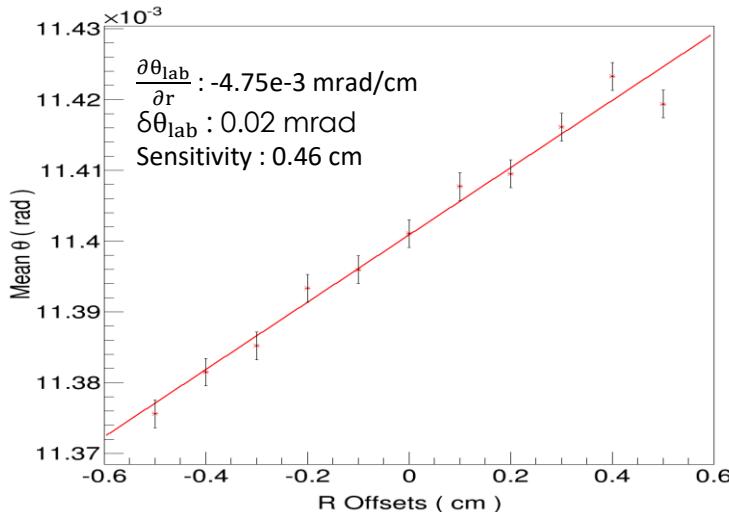
Rate-Integral vs R Offsets



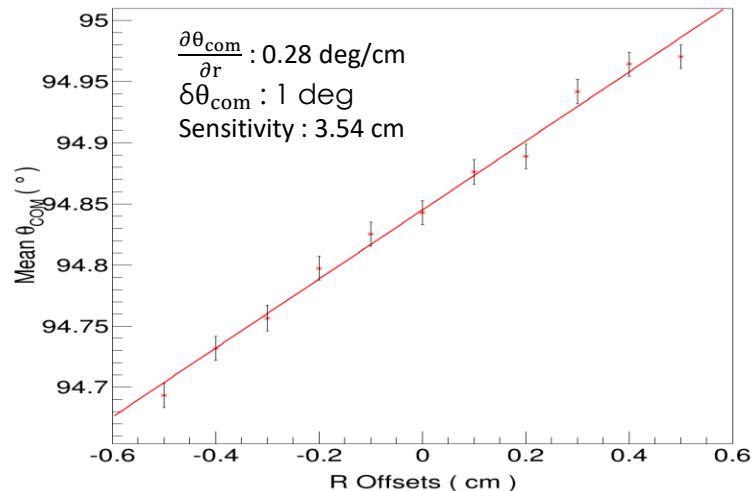
Mean Asymmetry vs R Offsets



Mean  $\theta$  vs R Offsets



Mean  $\theta_{\text{COM}}$  vs R Offsets



Sensitivity=Slope x Allowed Uncertainty

# Beam Deflection Studies

- Changes to Geometry :
  - Move coils in simulation (Just field map changes not sufficient).
  - Add an additional plane disc detector before upstream toroid.
  - Make the toroid coils sensitive detectors.
- Optimize the following before full simulations:
  - Amount of space taken up by root files.
  - Amount of running time on server.
- Working Plan:
  - Strip unnecessary branches.
  - Bias phase space generation.
  - Consider reducing the number of events.
  - Consider reducing the number of values tested for each offset.
- Aim to finish by end of December.