Detector 1 Far-Forward DWG: Integration

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Kick-off Meeting

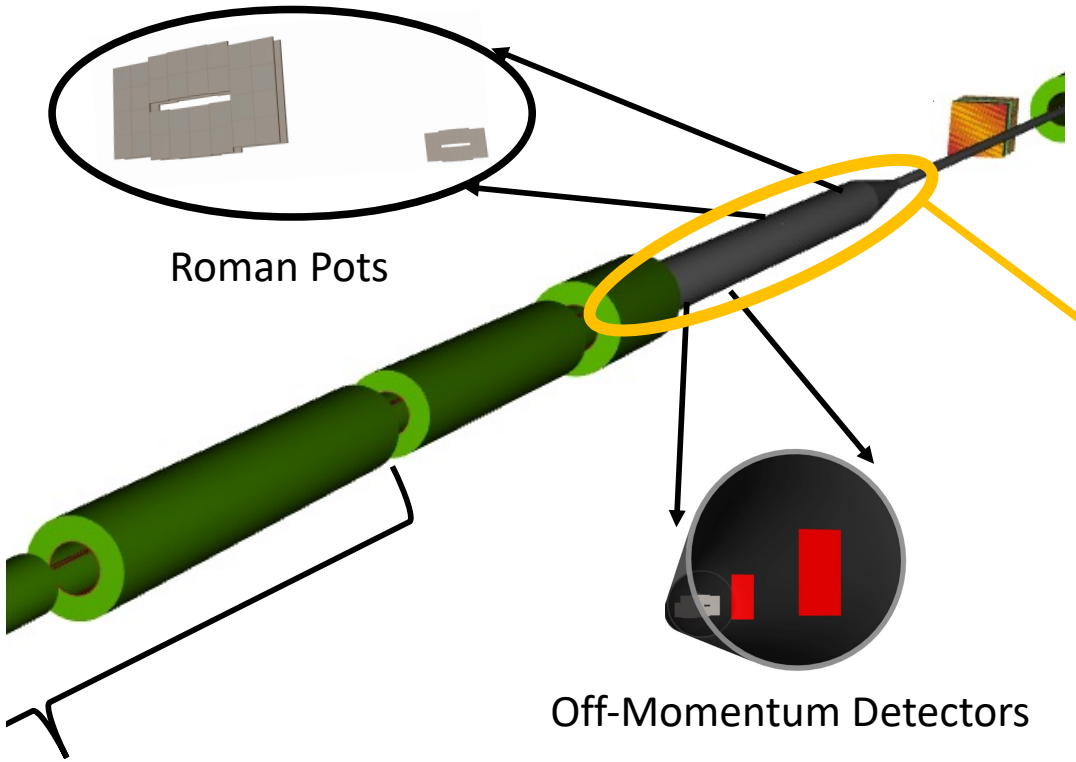
- Meeting held on Tuesday, April 26th @ 10am EDT.
  - Indico: https://indico.bnl.gov/event/15457/
- Gave full overview of the FF systems, and detailed differences (very minor) between the ECCE and ATHENA configurations.
- Spent time discussing, and emphasizing need to move toward realistic materials and integration considerations to advance simulations.

(preliminary, non-exhaustive) FF Integration Needs

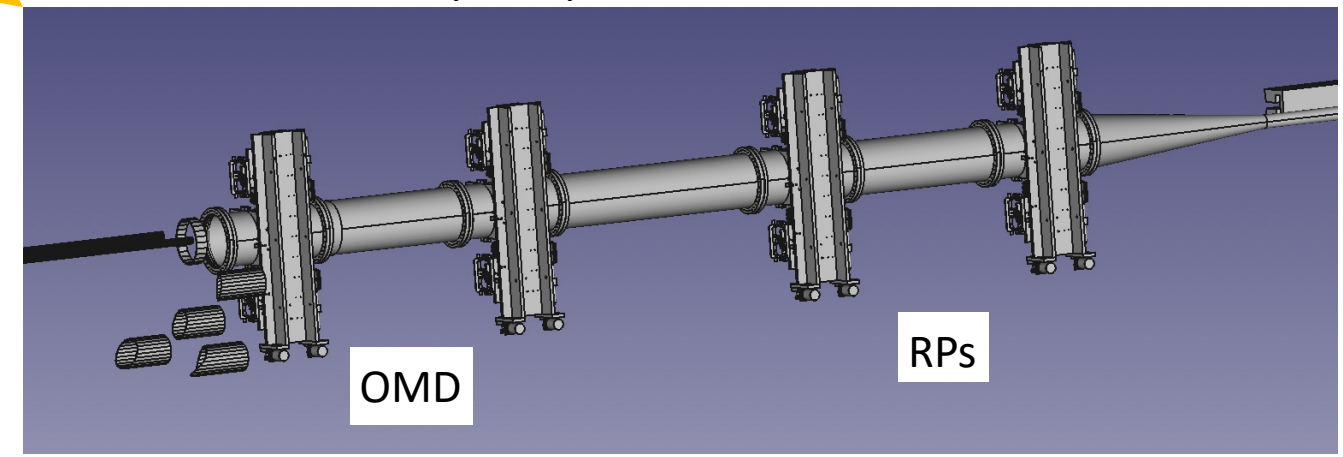
- Vacuum system
  - Beam pipe, flanges, pumps, etc. for both the drift region (e.g. Roman pots), and the B0 detector system.
- Exit window/taper for neutral particle exit to ZDC
  - Current considerations are basic, but not too far off from what is possible. But this needs to be refined – has direct impact on vetoing efficiency, and especially affects low energy photons.
- Support structure and material thickness for silicon detectors
  - Some work already done via inclusion of STAR FST structure concept into the B0 tracking layers.
  - Needs to evolve with B0 magnet changes (e.g. length of magnet).
- Material thickness for active silicon planes
  - Cooling, ASICs, silicon thickness, etc.
  - We have some of these numbers now – need to include in simulations and begin to assess impact.
- Backgrounds
  - Beam+gas, secondaries from machine scattering, neutrons, etc.

These are just examples – there are other issues (services, cabling, etc.). We will need to start thinking about including these components consistently in the GEANT simulations to assess the impact on physics.

Roman Pots and Off-Momentum Detectors



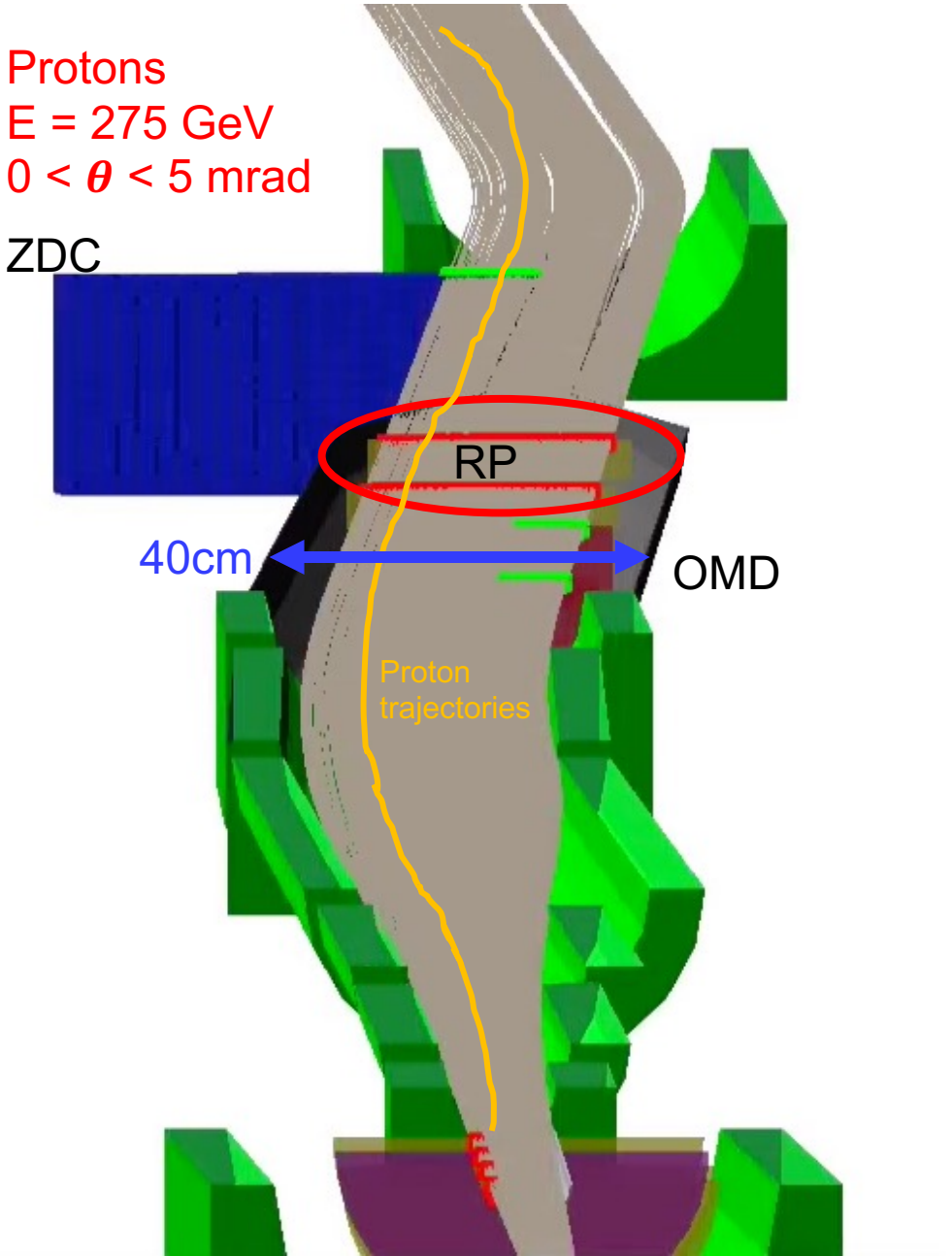
Preliminary setup for EIC

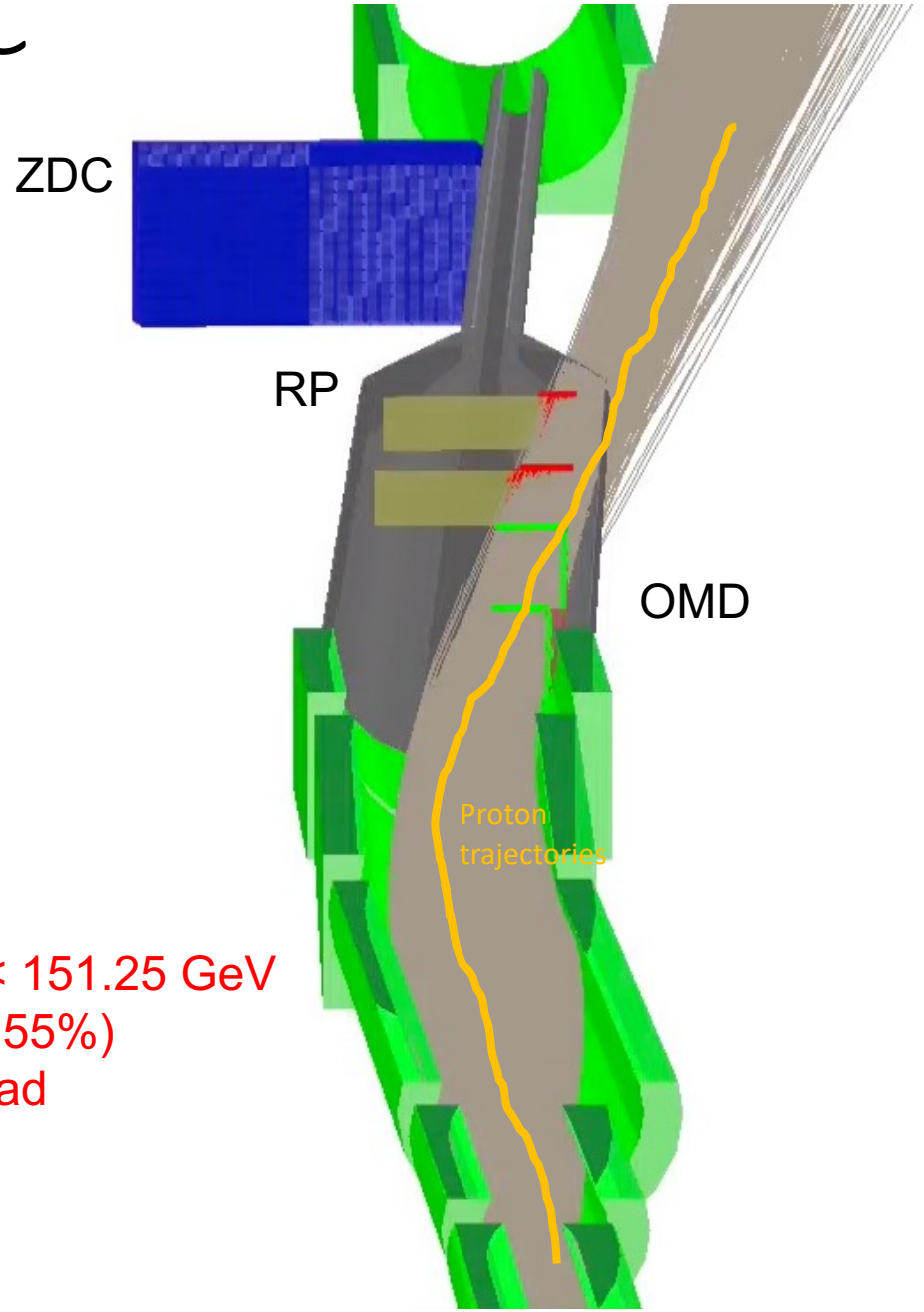


Ranges from ~22-28 meters from IP

Roman Pots and OMD @ the EIC

Protons
E = 275 GeV
0 < θ < 5 mrad





Protons
123.75 < E < 151.25 GeV
(45% < xL < 55%)
0 < θ < 5 mrad

EICROOT GEANT4 simulation.

ZDC & neutral particle exit

Want to have as large an incident angle with the beam pipe as possible.

This is the problem area → shallow incident angle can increase effective material thickness by ~ factor of 10!!

Beryllium doesn't help here since Be reflects neutrons. Al would be great, but this large of beam pipe section may require stainless steel.