IR Simulations Update

Alex Jentsch

eRHIC IR Meeting

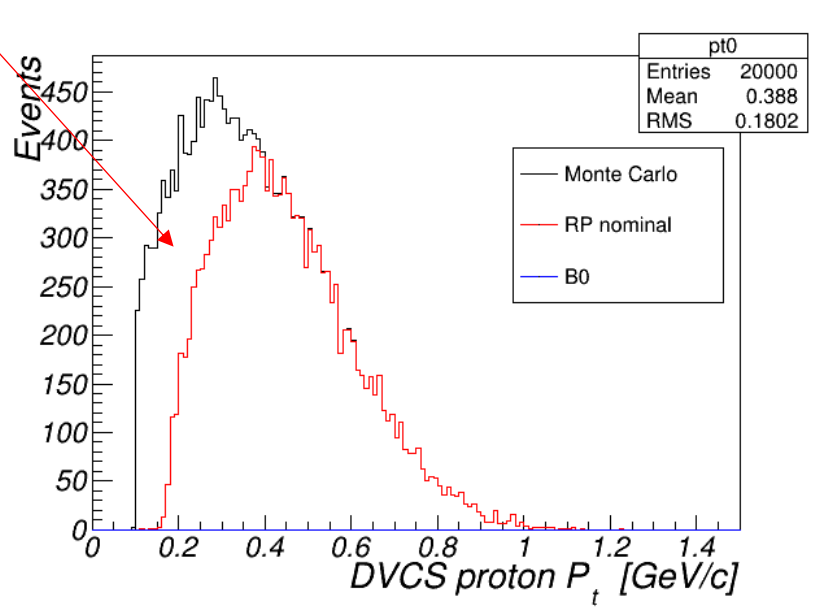
Oct. 18th, 2019

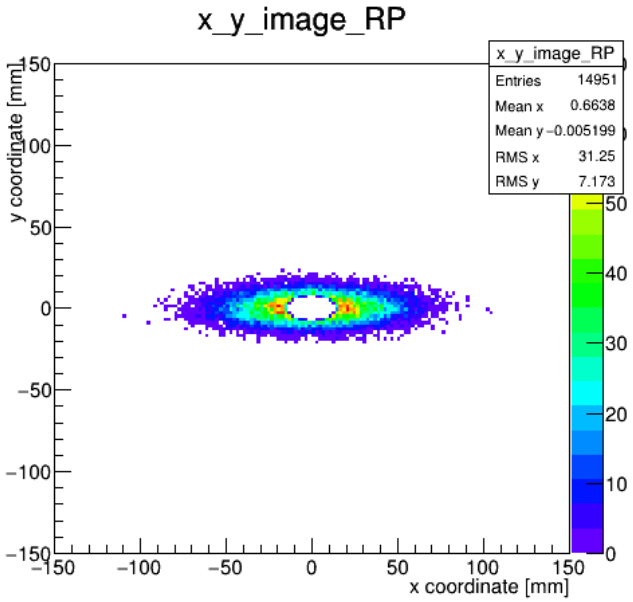
Previous Simulations

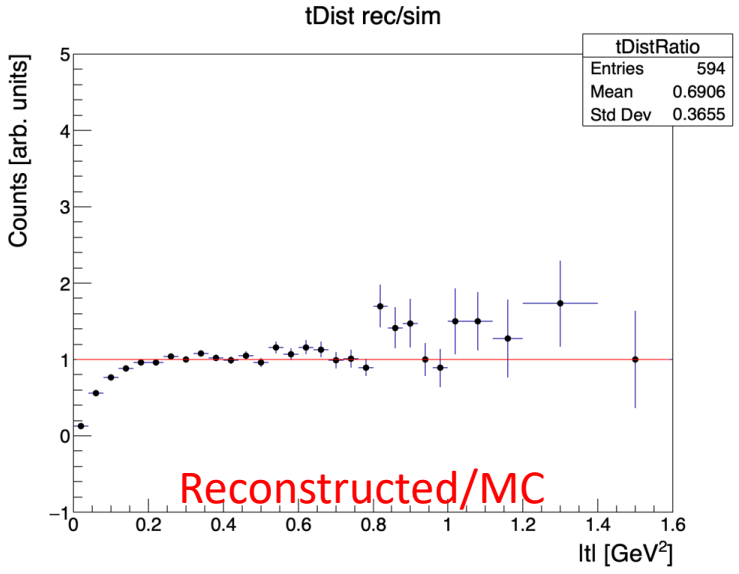
- Studied acceptances of forward proton detection for different beam energies.

Low-pt an issue

275 GeV– High Acceptance





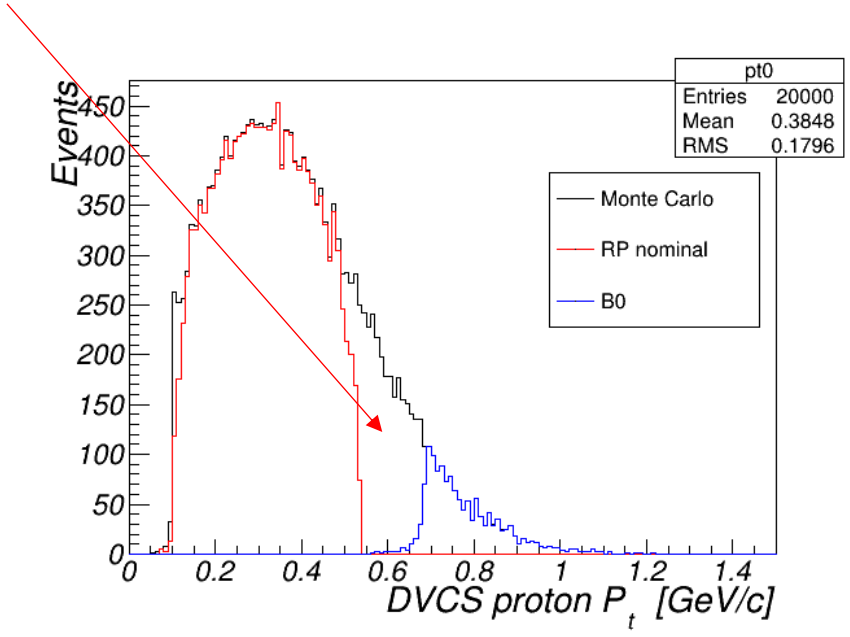


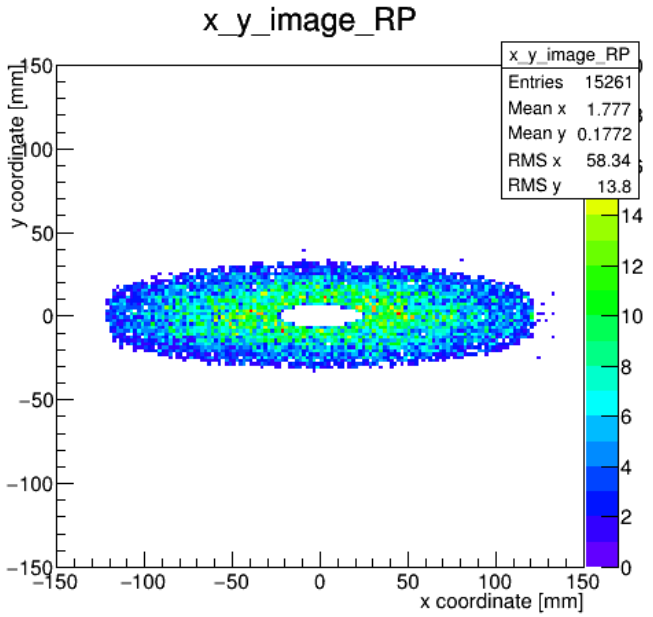
Previous Simulations

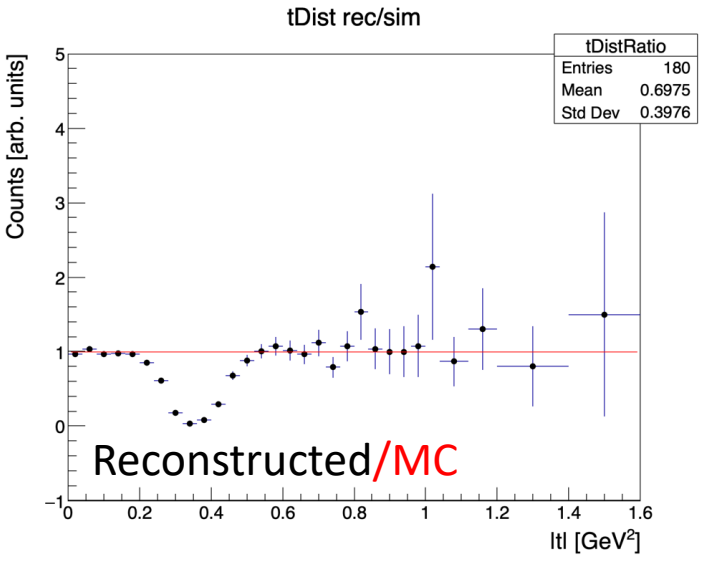
- Studied acceptances of forward proton detection for different beam energies.

Acceptance gap

100 GeV– High Acceptance



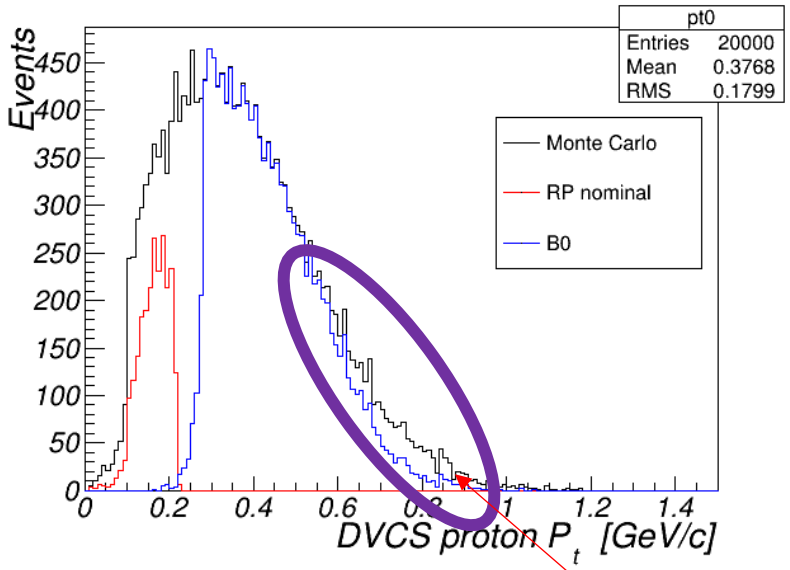


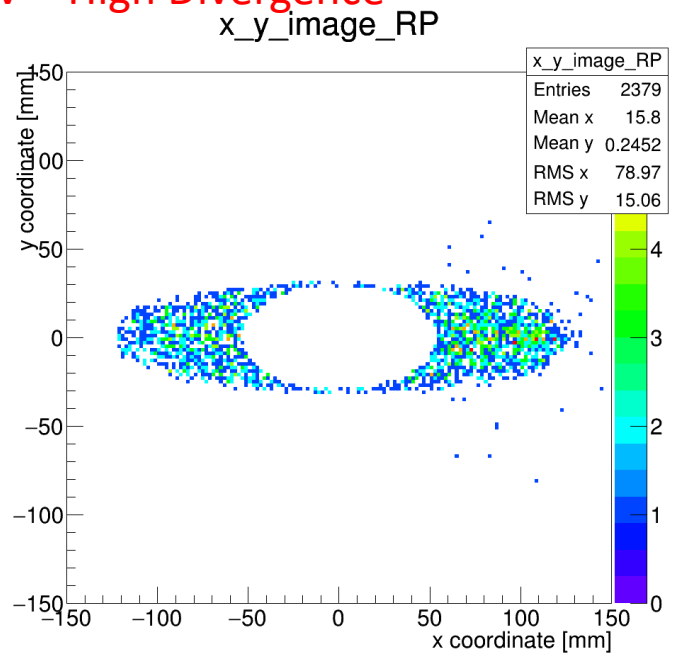


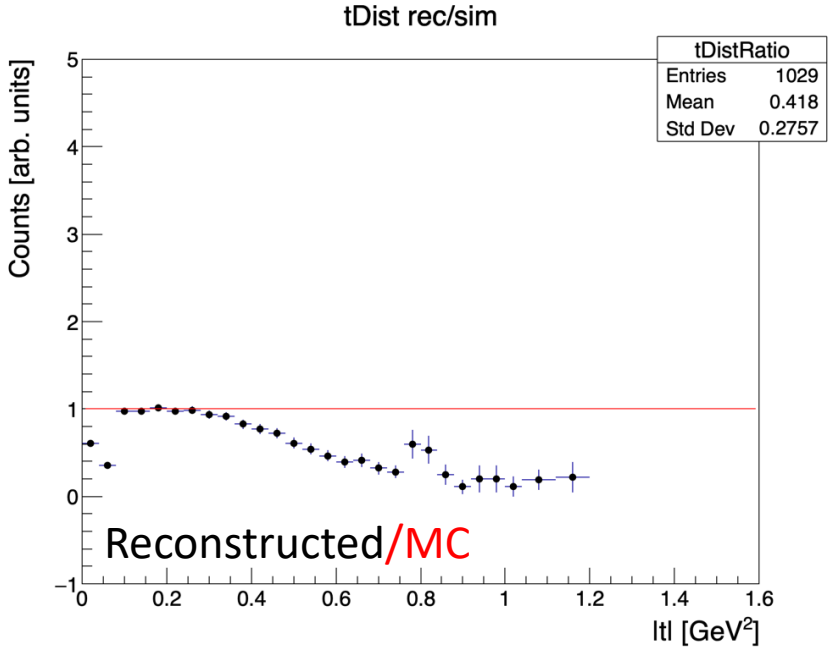
Previous Simulations

- Studied acceptances of forward proton detection for different beam energies.

41 GeV – High Divergence





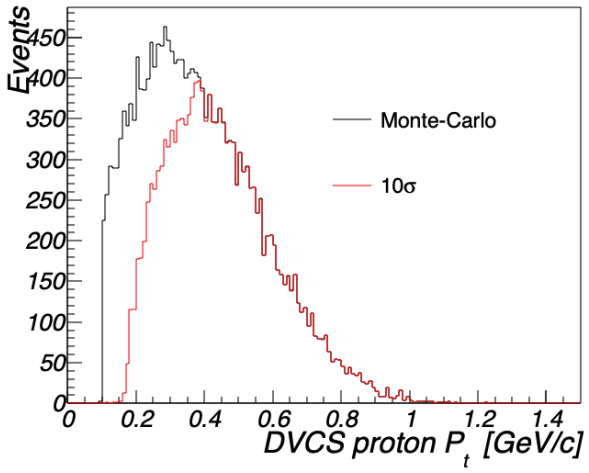


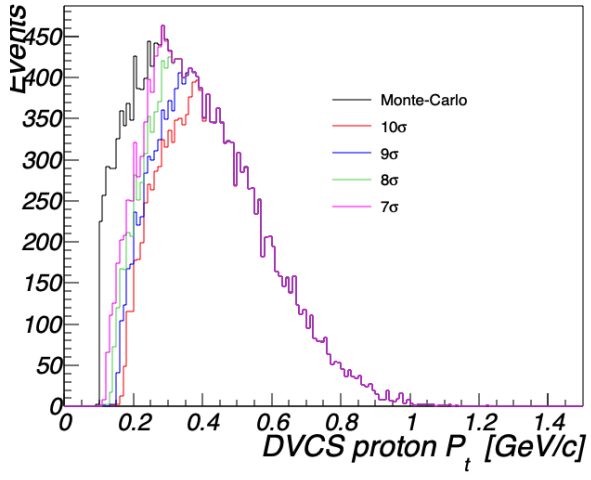
Acceptance issues at high-pt -> more study needed on B0 sensor layout optimization.

Side Note on Acceptance – Safe RP nσ

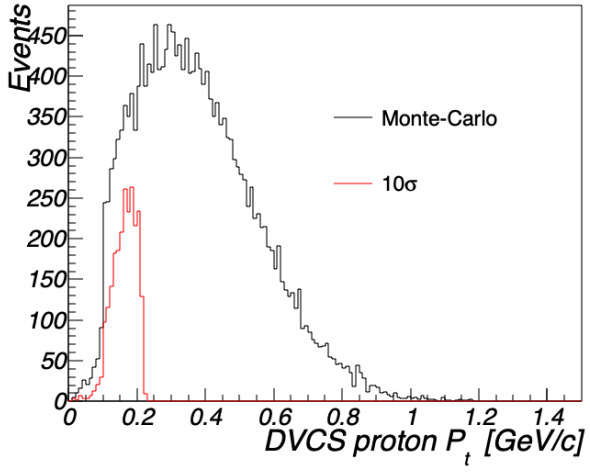
- The STAR Roman Pots have been successfully inserted down to 8σ** during top energy p + p (510 GeV).
  - Can we gain back lost acceptance by doing the same with the eRHIC Roman Pots?

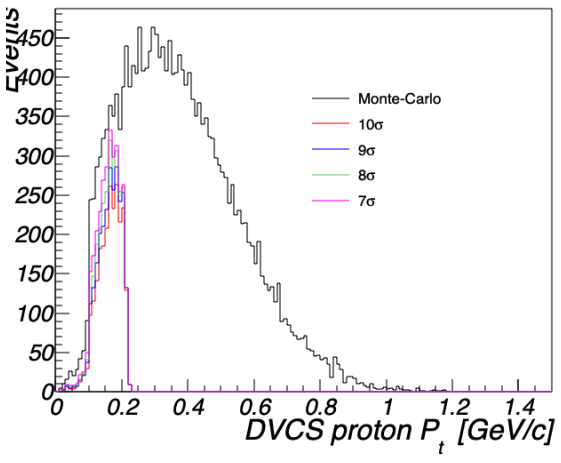
275 GeV DVCS





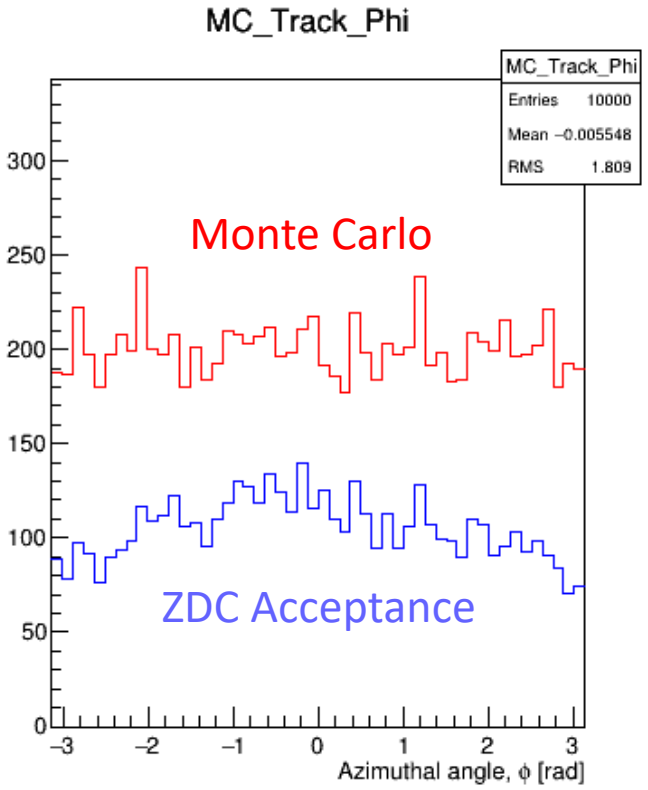
41 GeV DVCS

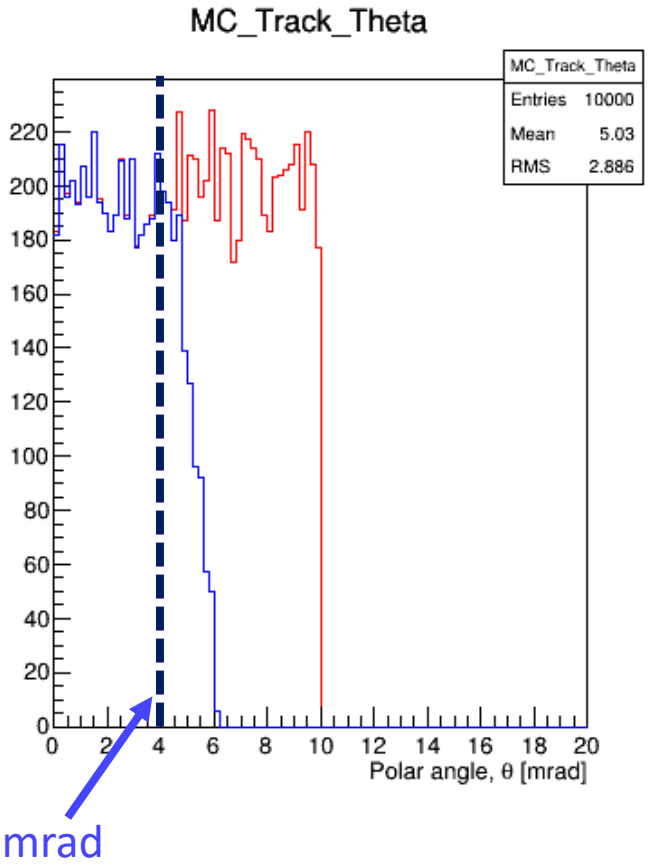


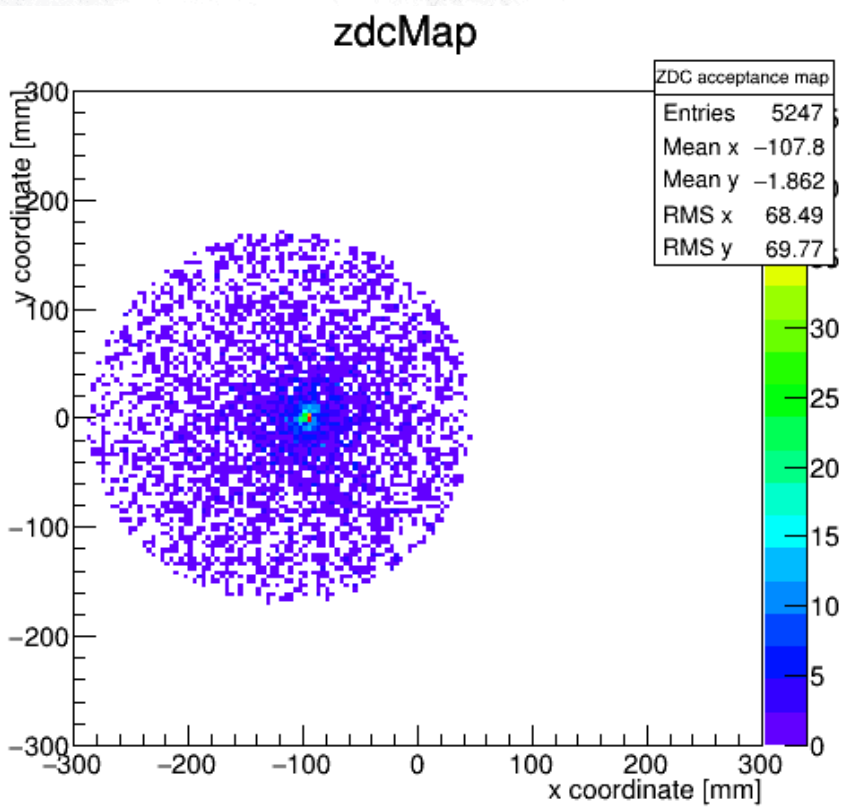


**Actually, the "pot" was at 8σ, the sensor effectively at 10.

Previous ZDC Simulations



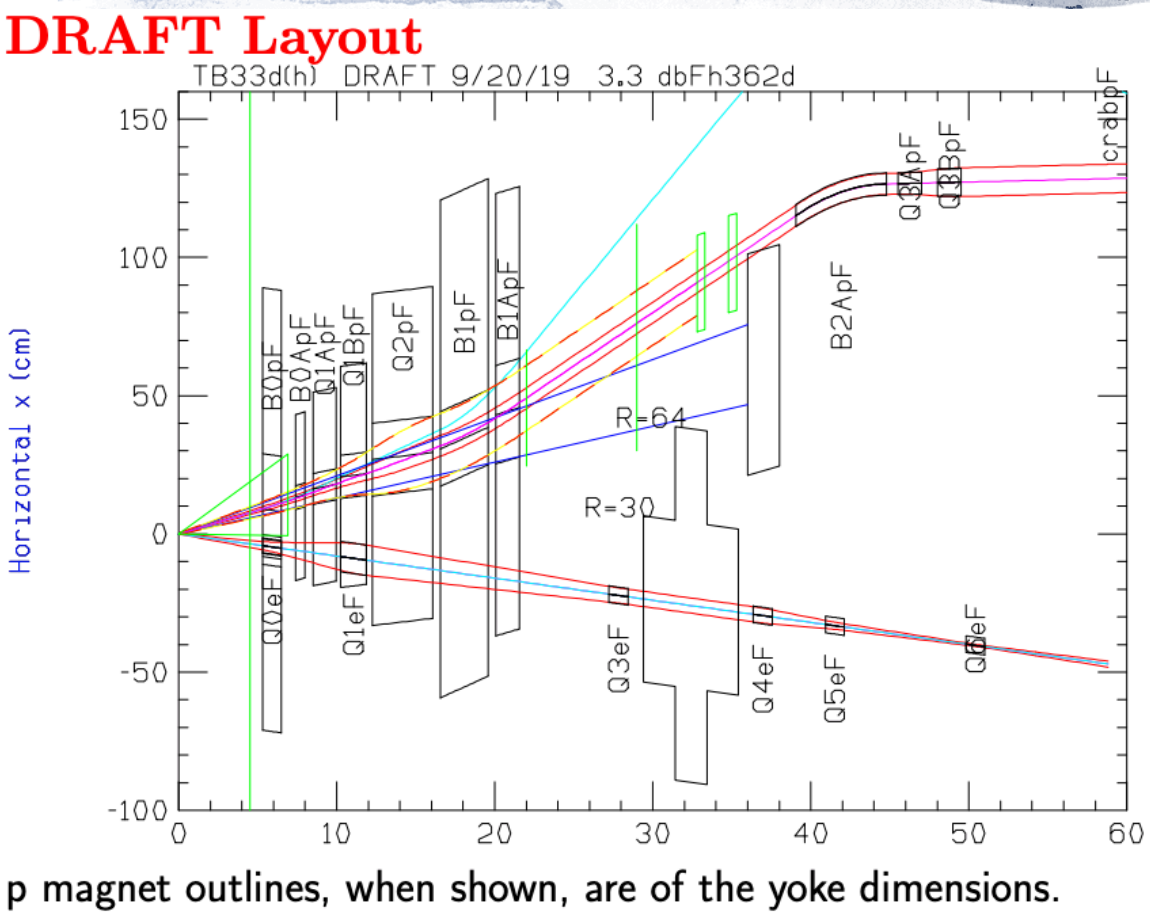




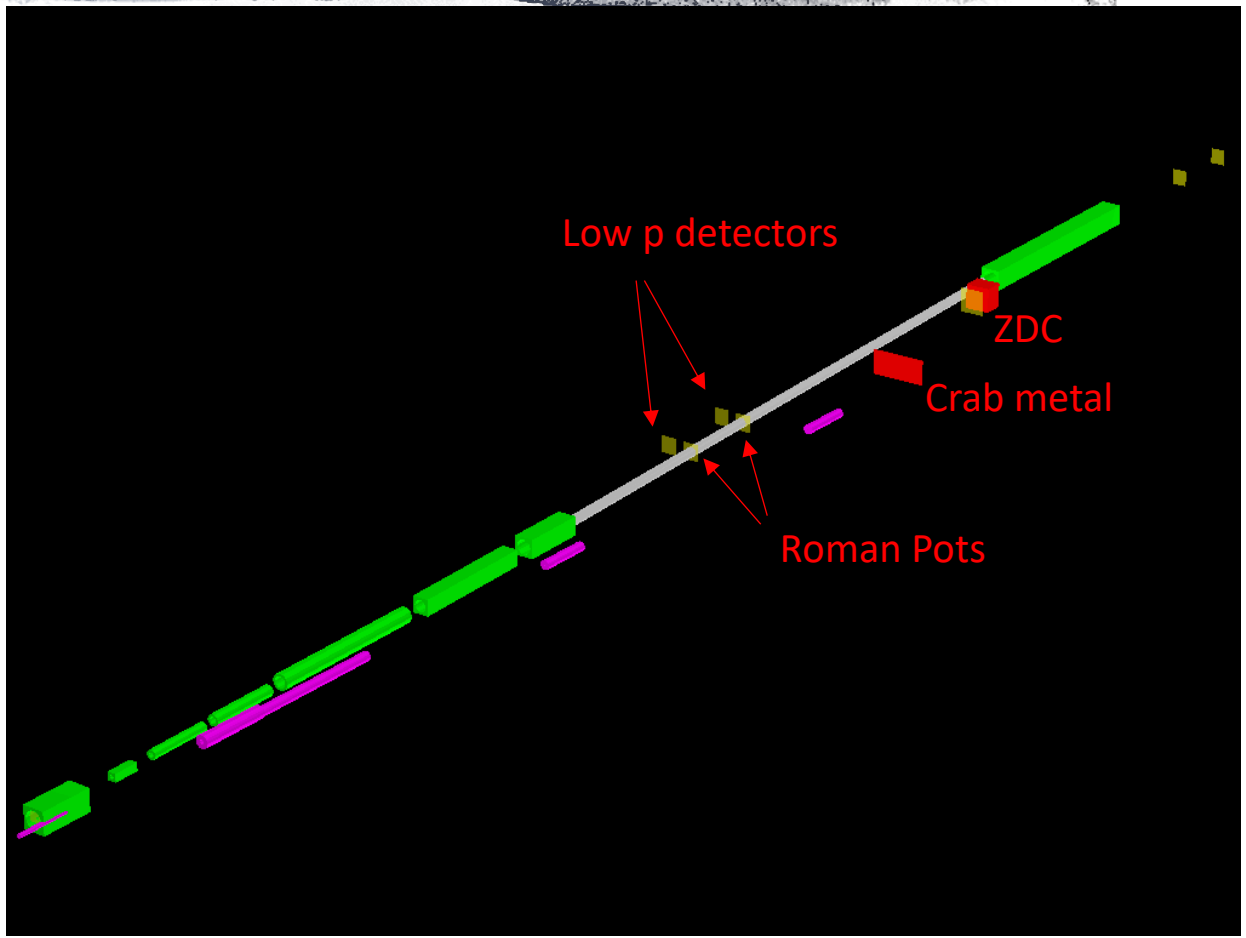
Crab Cavity Simulations

- Added a 5 cm thick block of metal as close as possible to where the crab cavity wing blocks the neutron cone in Bob's design from a month ago.
  - Tried different metals as well (Al, Steel, Pb)

Crab Cavity Simulations

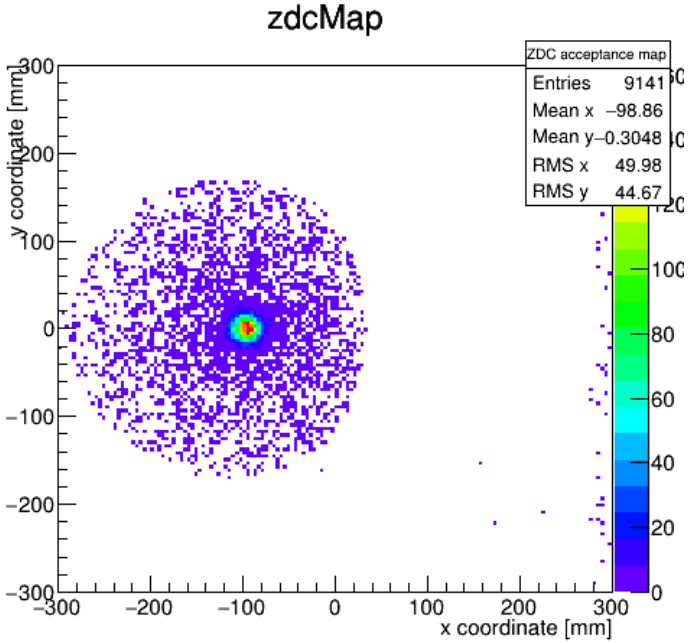


p magnet outlines, when shown, are of the yoke dimensions.

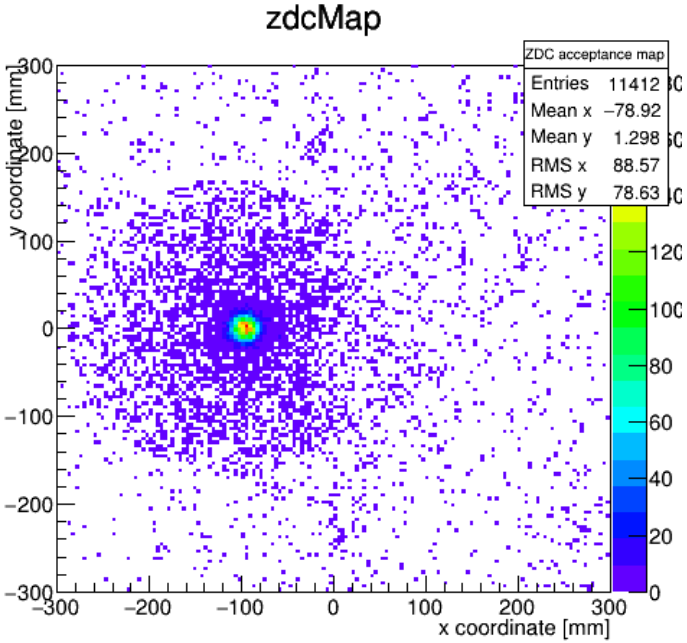


Crab Cavity Simulations

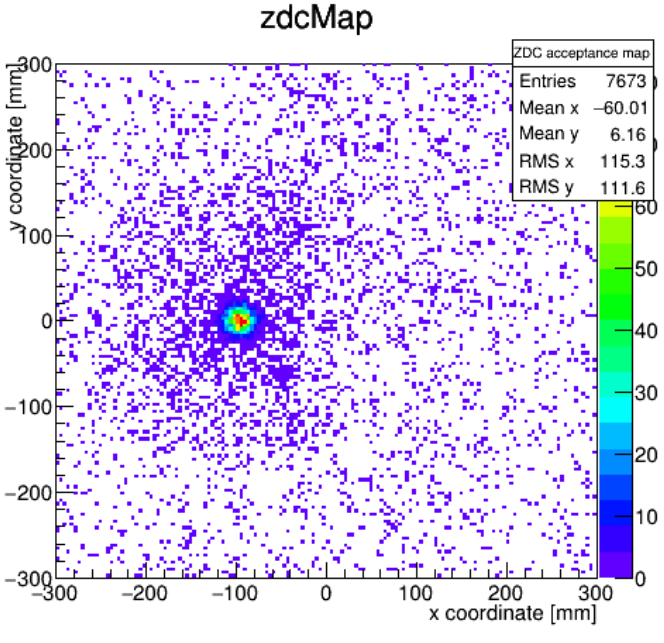
- **Having the crab cavity in that portion of the IR could cause major problems with our ZDC.**



Nominal – no crab cavity



Crab cavity - Aluminum



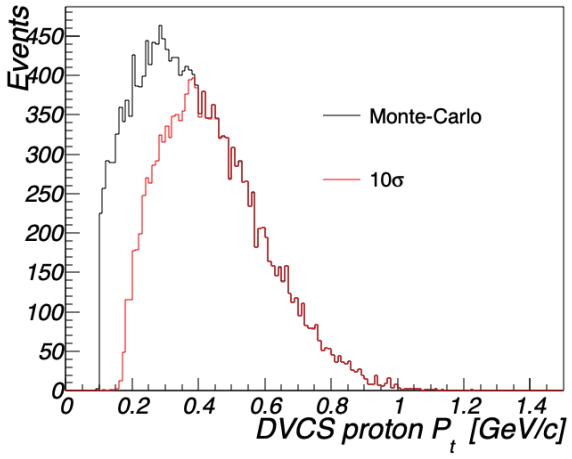
Crab cavity - Steel

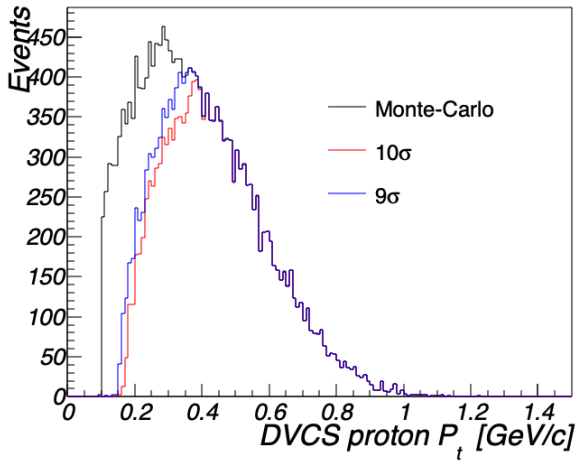
BeAGLE: 10 GeV (e) on 110 GeV (Au)

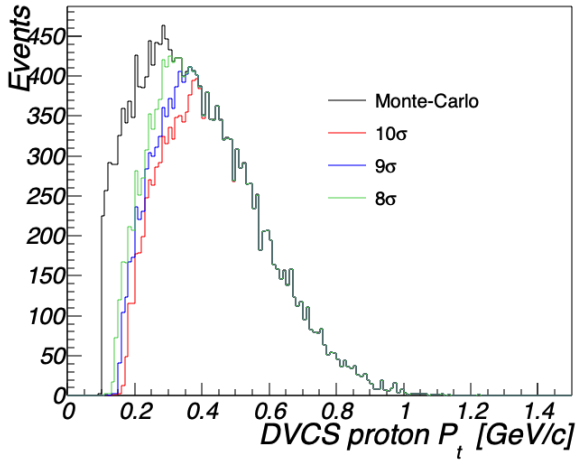

Thanks!

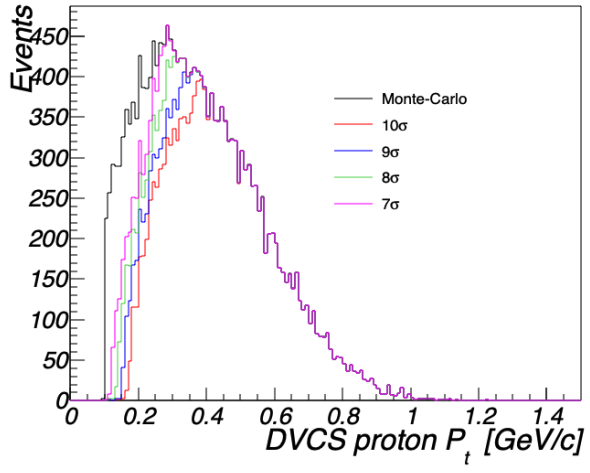
Full nSigma Plots – 275 GeV

- All nSigma plots









Full nSigma Plots – 41 GeV

- All nSigma plots