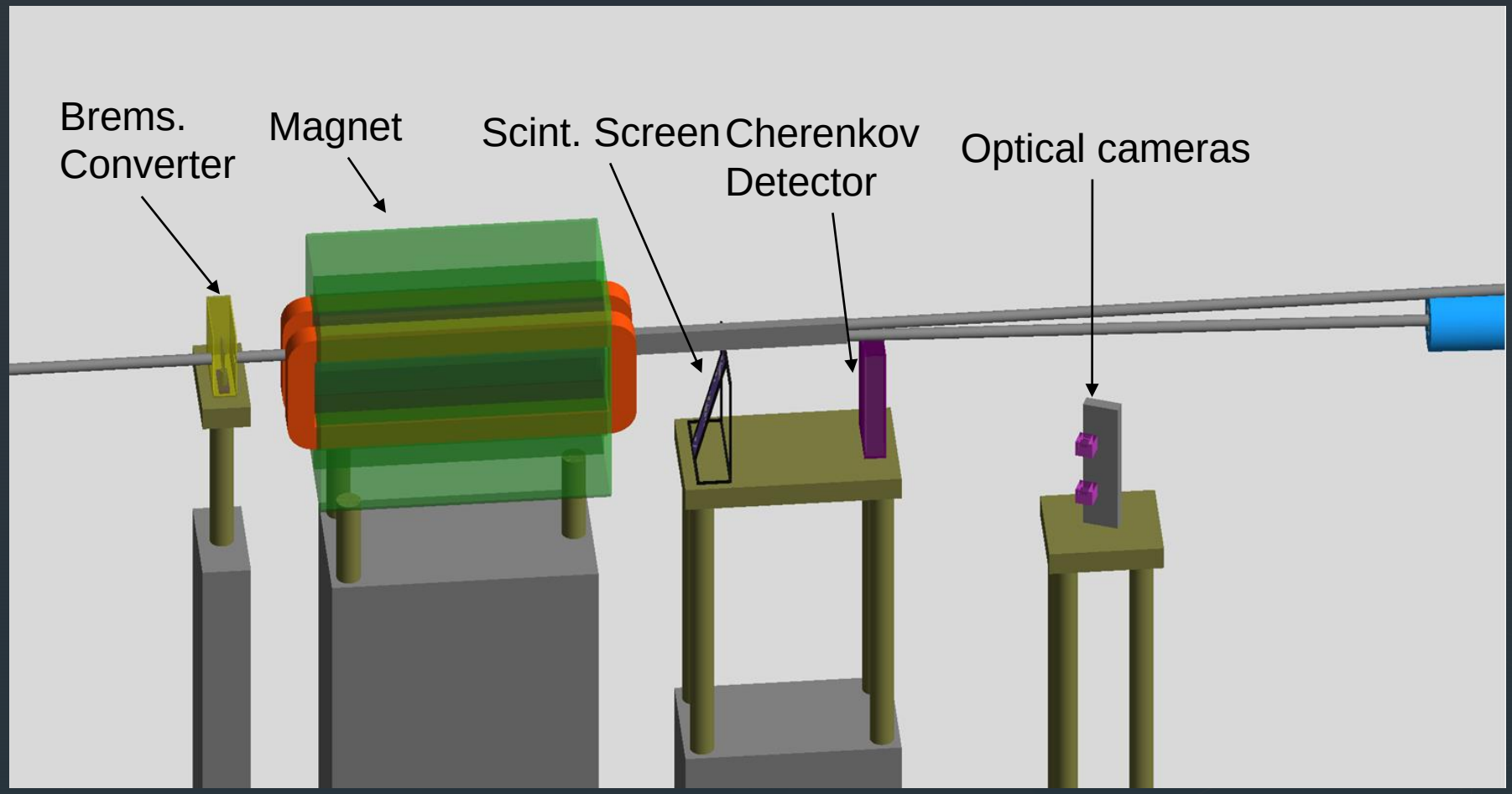
Vacuum Chamber Study Update

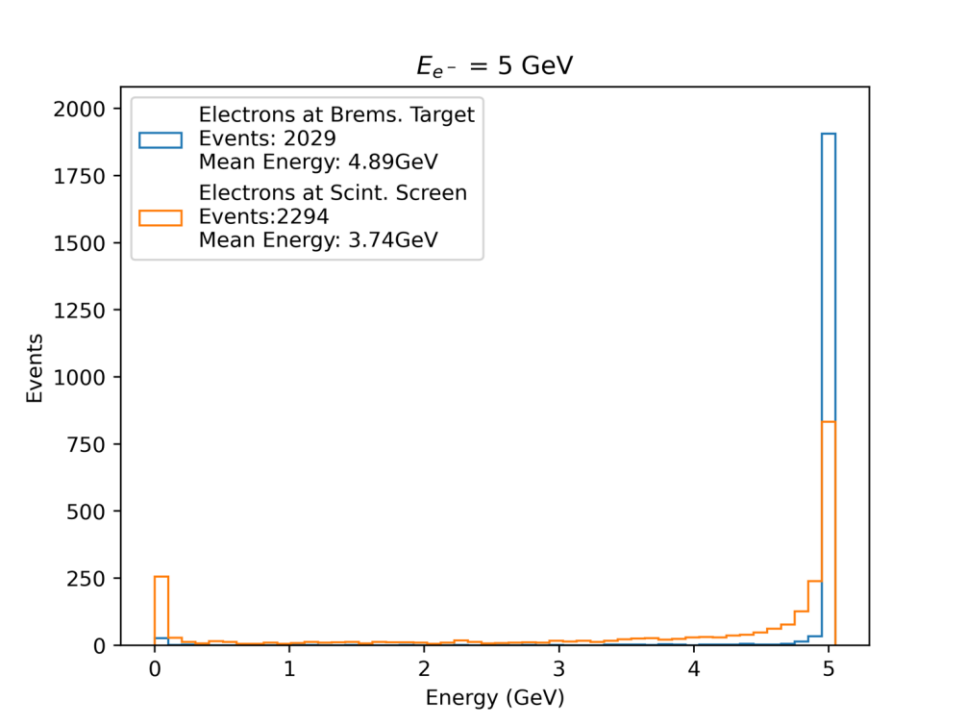
Original Setup



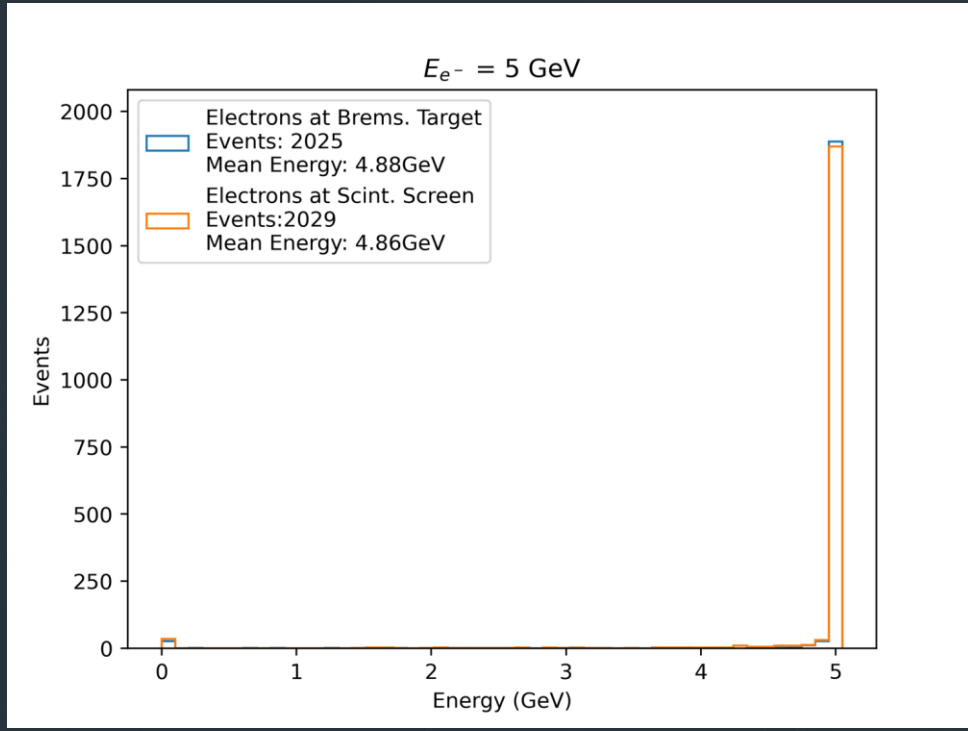
Issues with this setup

- Energy spectrum distorted due to beam pipe

IBM with Beam Pipe

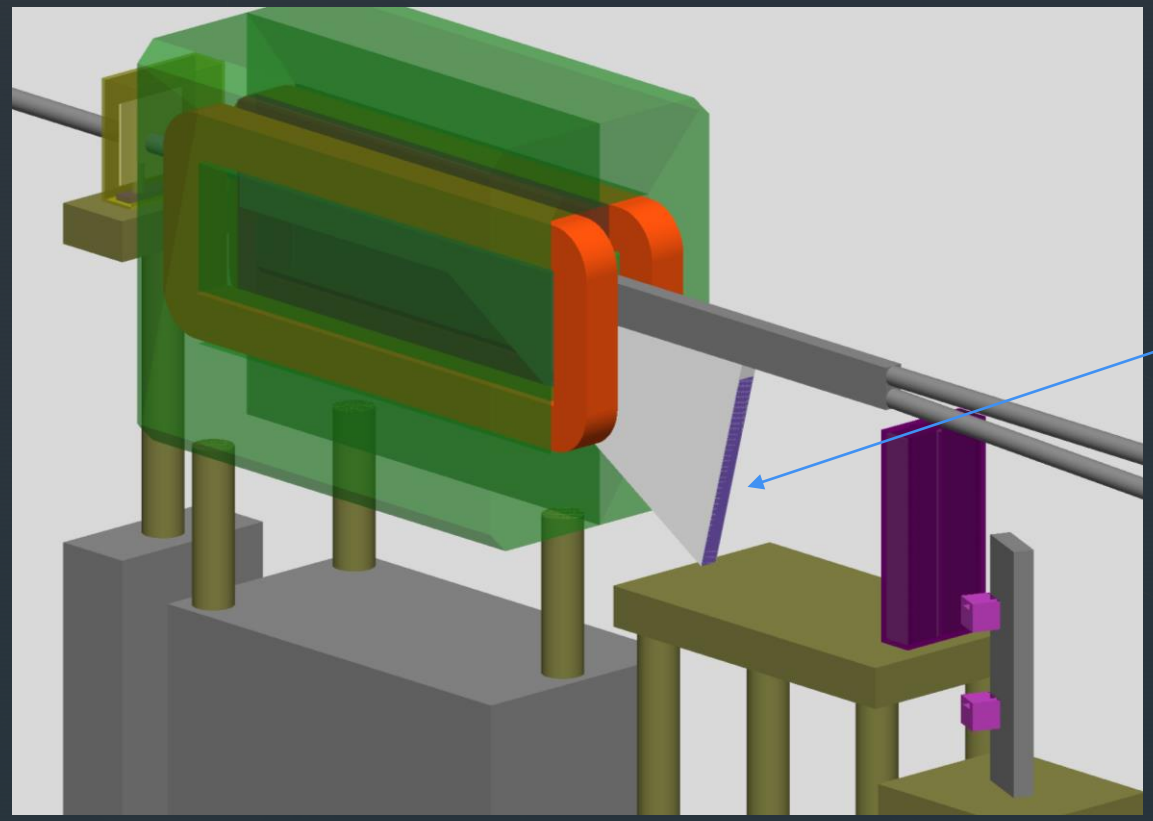


IBM without Beam Pipe



Vacuum Chamber Design

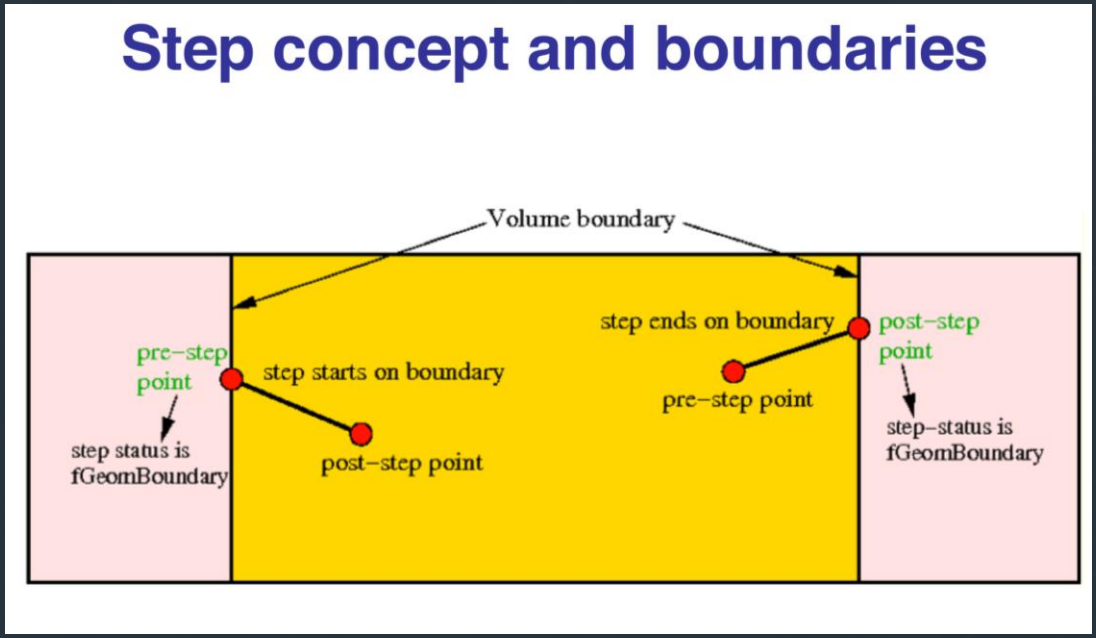
Extension of beam pipe with a 300 µm aluminium window



Scintillator screen directly attached to window

Measurements

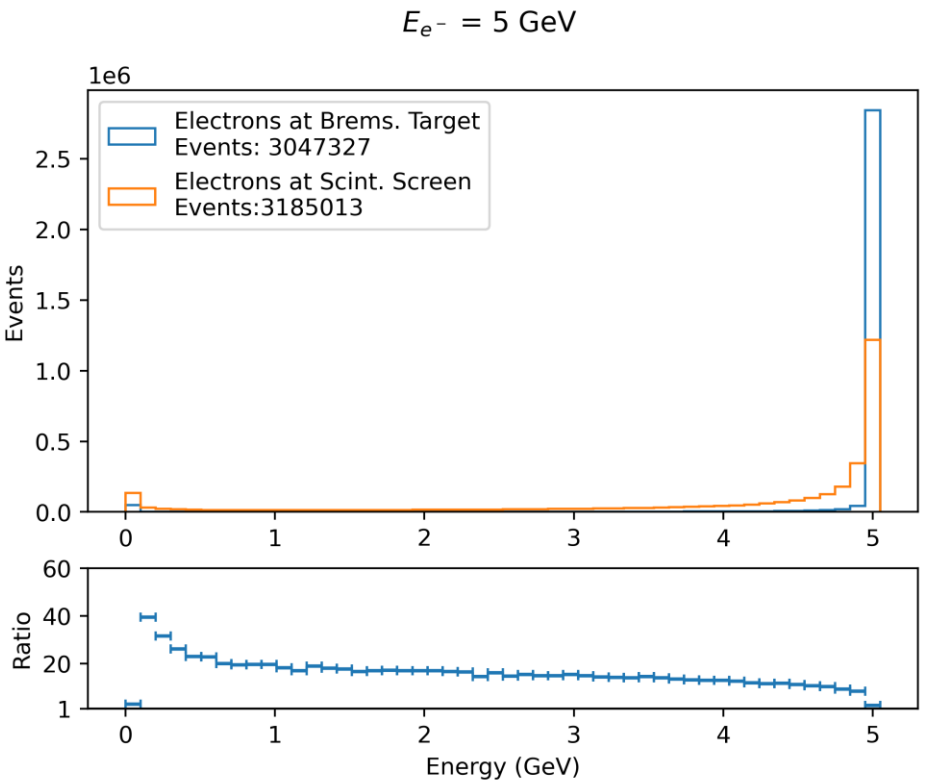
- Scintillator screen has 3 layers (2 plastic cover, 1 GadOx)
- Measured particle properties at boundary of scintillator screen (plastic cover)
- Measured at post-step point
- Also momentum direction cut applied



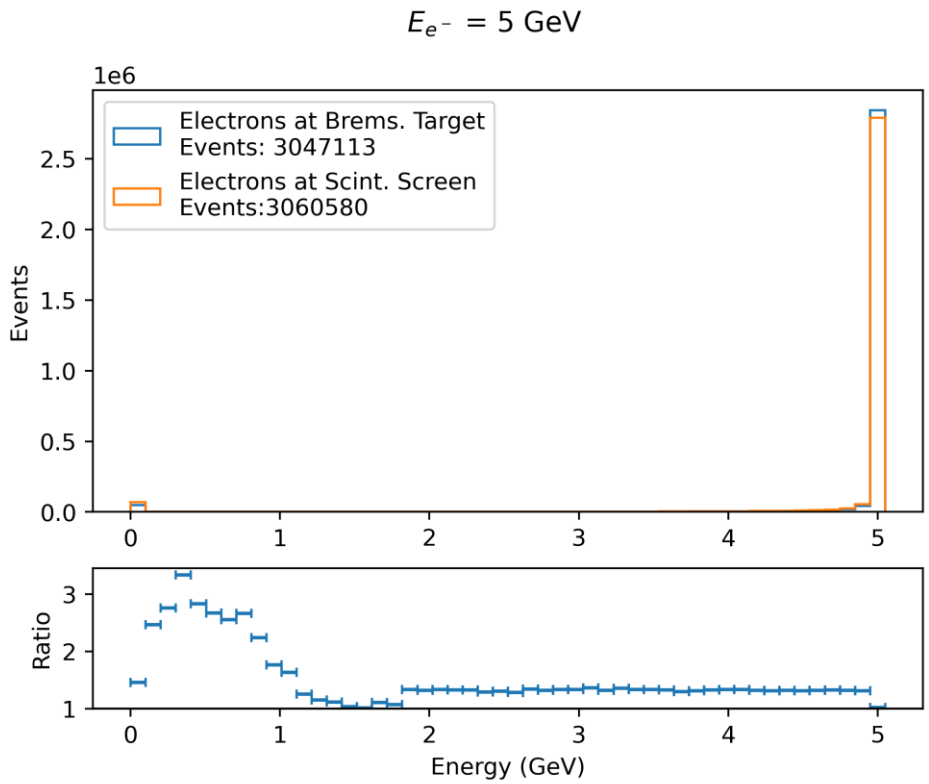
Final simulation results

- Electron energy spectrum

IBM with Beam Pipe



IBM with Vacuum Chamber



Final simulation results

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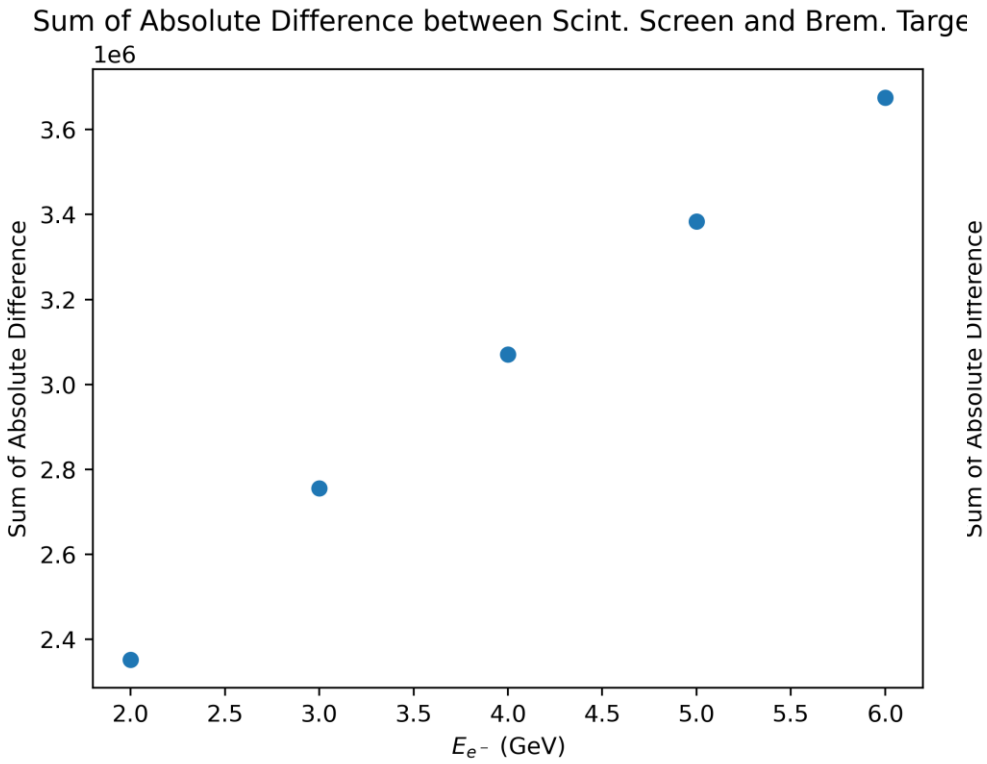
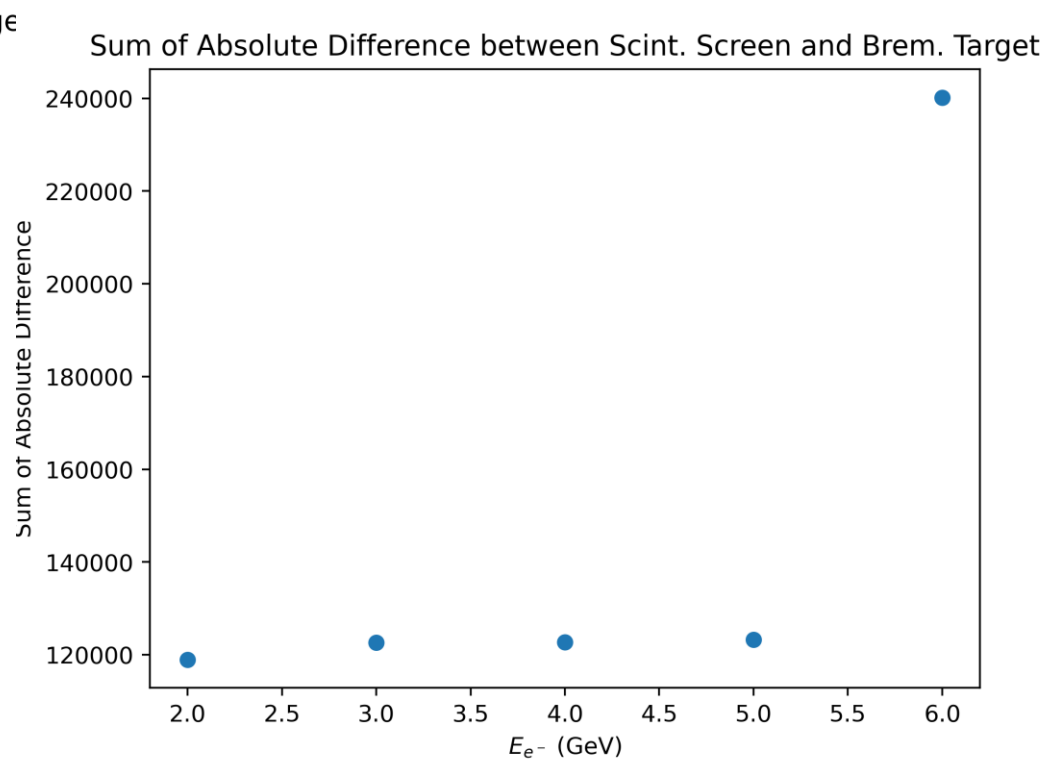
IBM with Beam Pipe



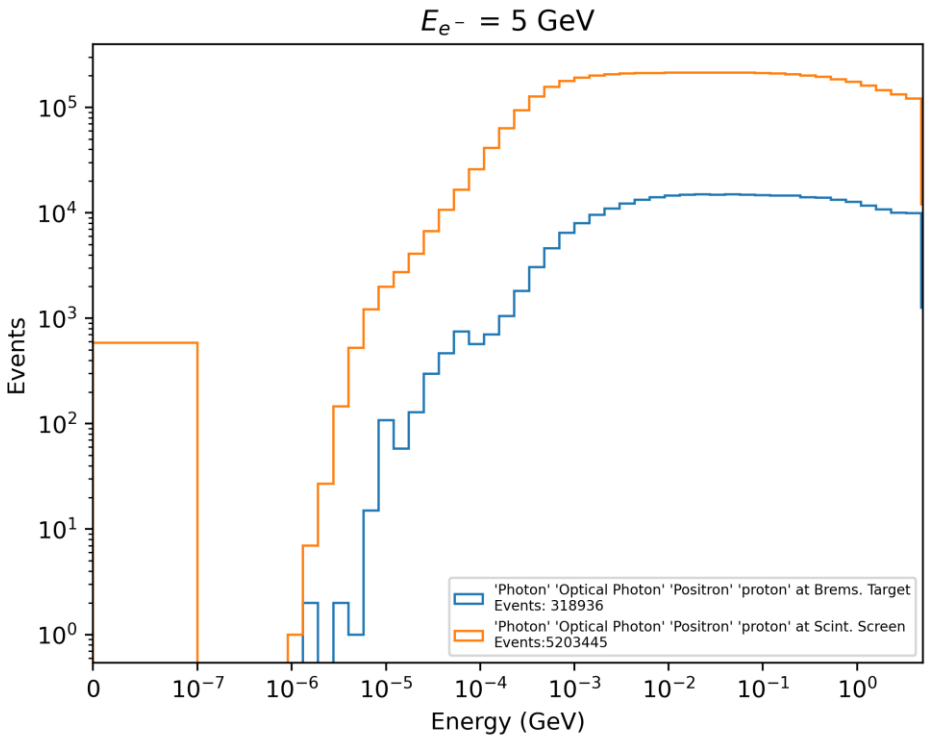
IBM with Vacuum Chamber



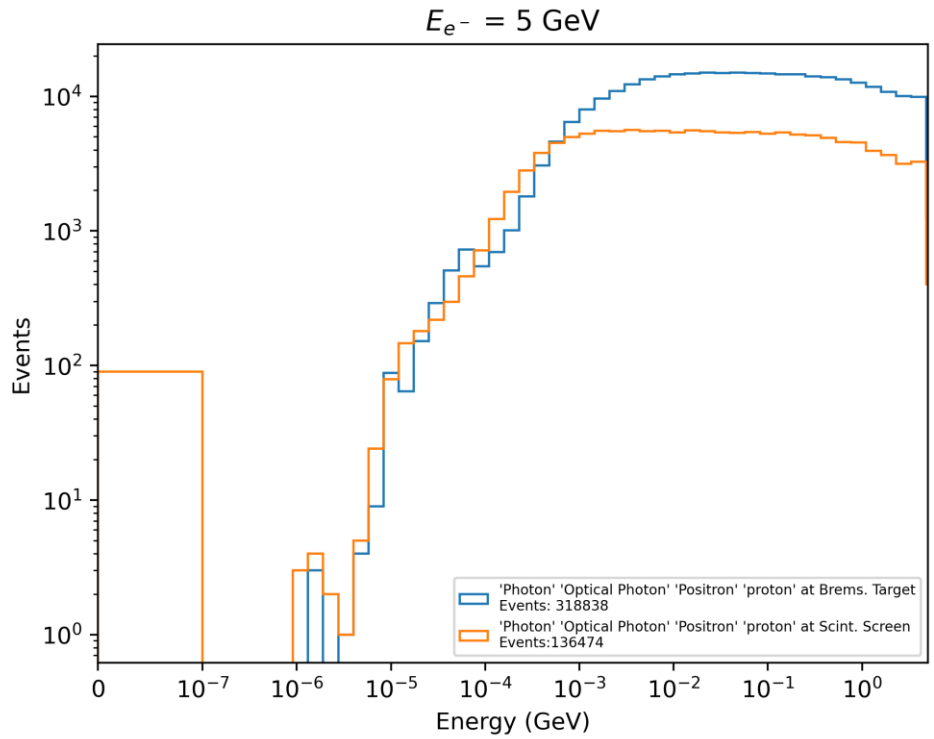
Final simulation results

- Background particle energy spectrum

IBM with Beam Pipe



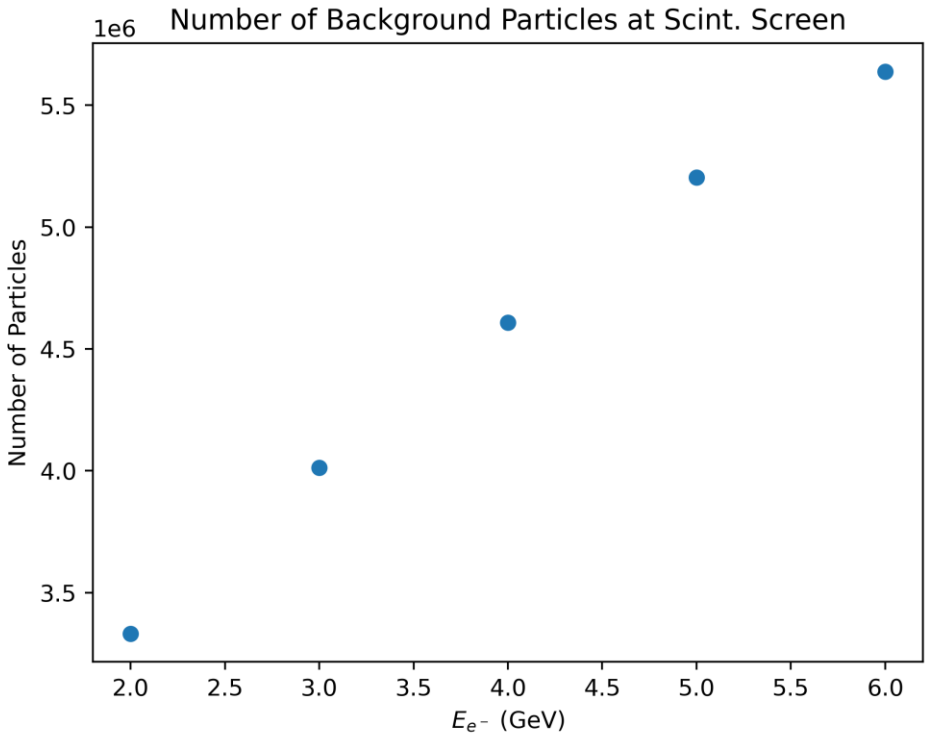
IBM with Vacuum Chamber



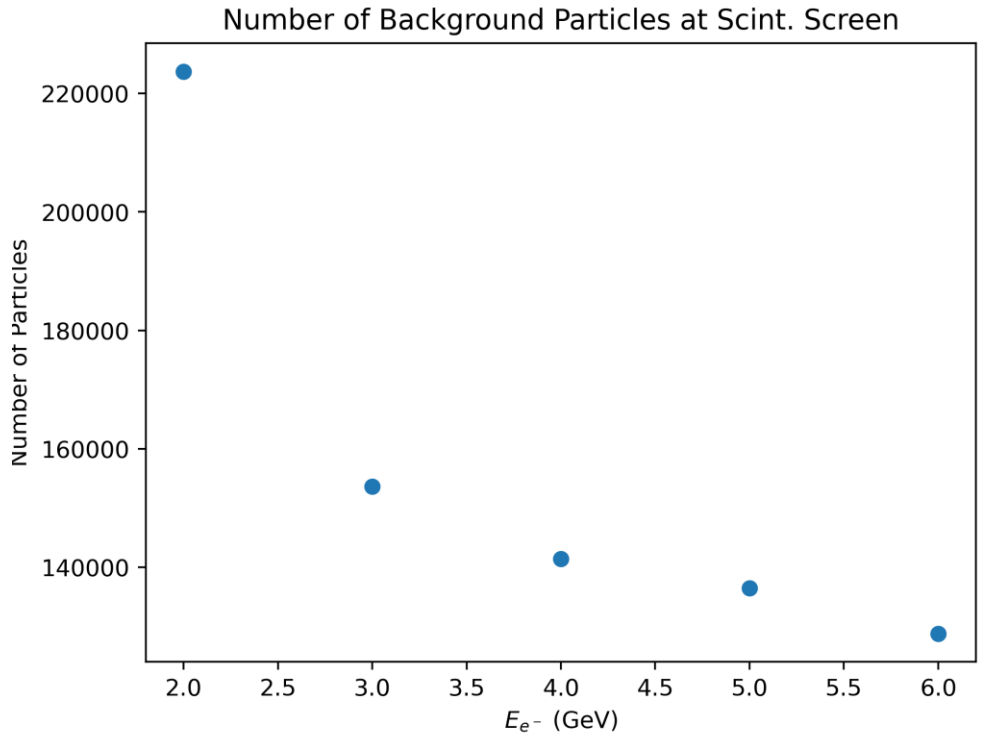
Final simulation results

- Background particle energy spectrum

IBM with Beam Pipe



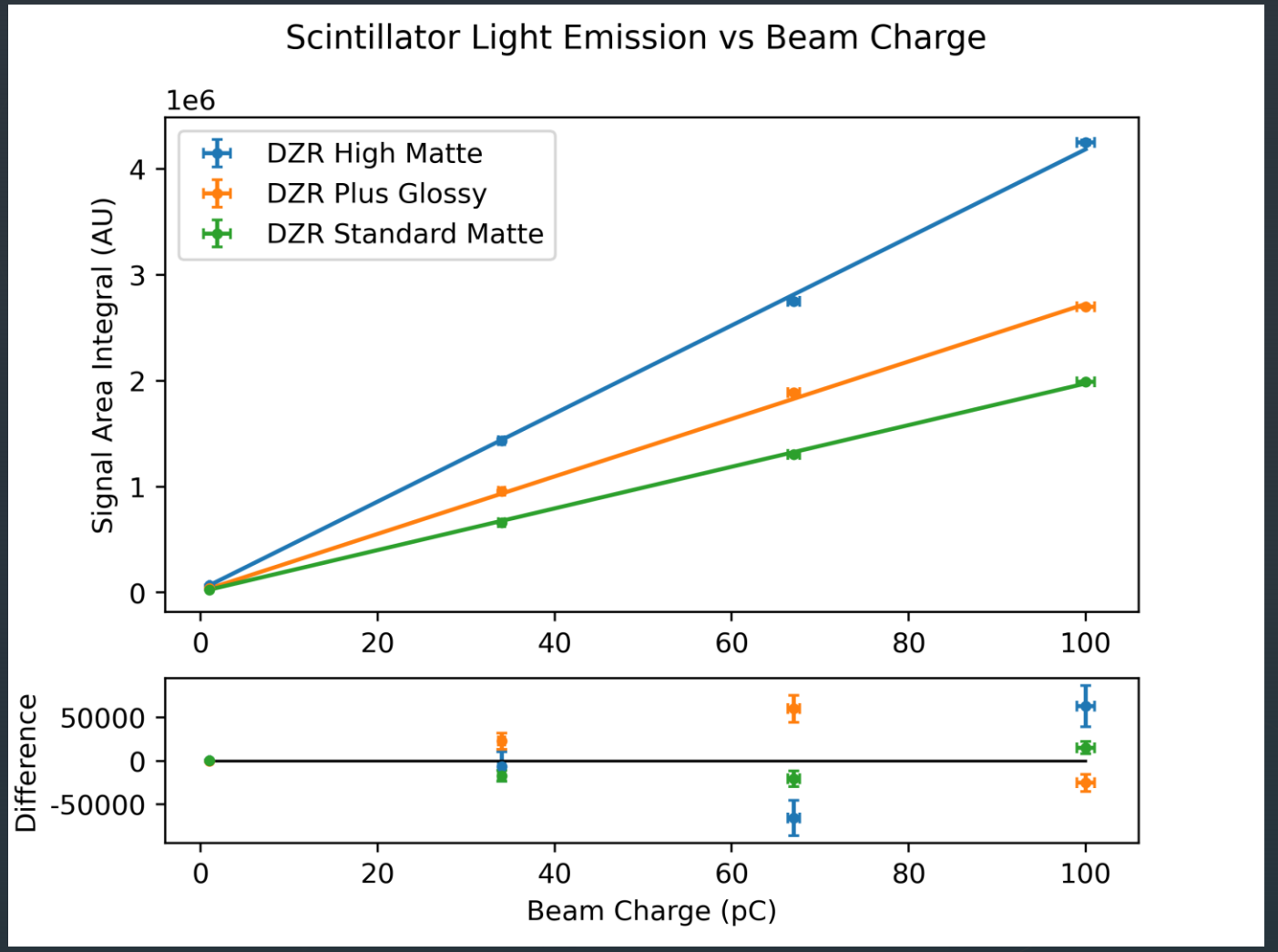
IBM with Vacuum Chamber



Conclusion

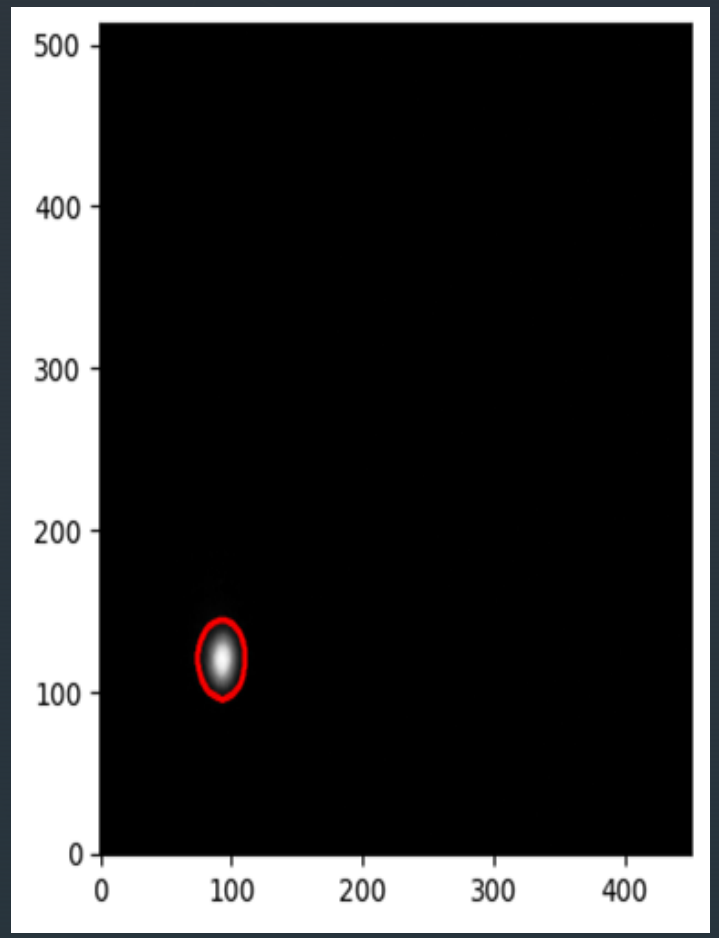
- With Vacuum Chamber:
  - Only small change in electron energy spectrum
  - Reduces background particles by a factor of 10

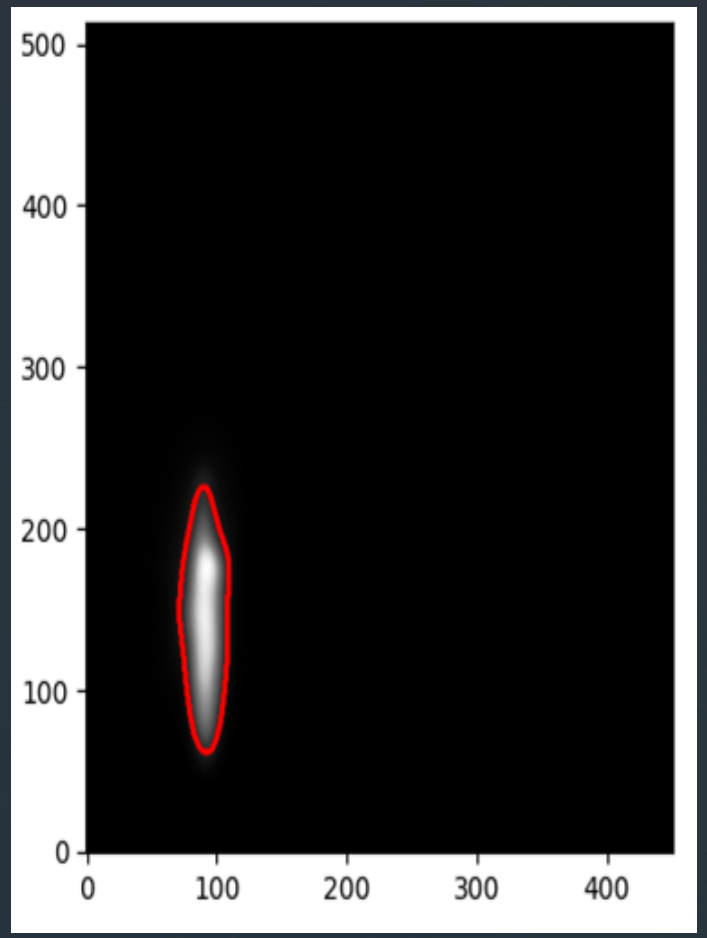
Update From Last Week



Update From Last Week

- OpenCV Edge detection quite successful

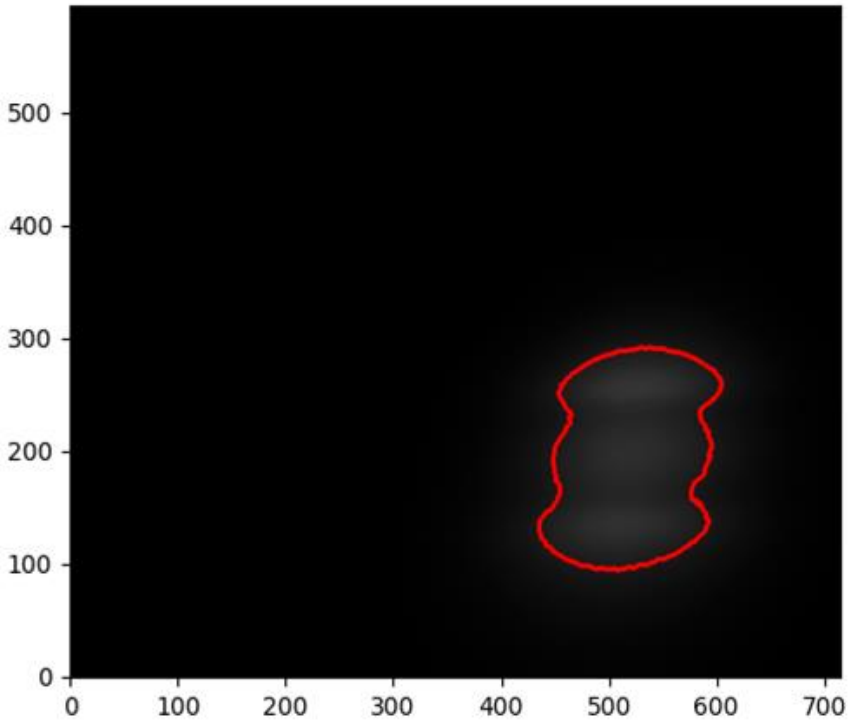




Update From Last Week

- However it does not capture whole beam spot for the back screen

Original brightness



Colour map