

# Run 2 spectrometer studies

D. A. Cooke

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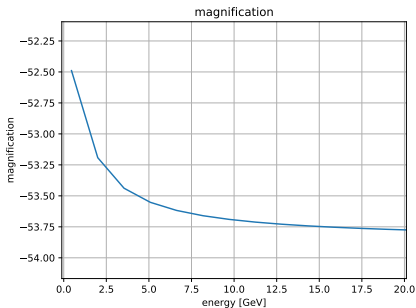
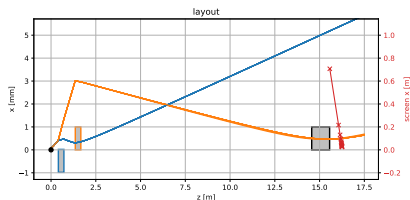
# Outline

Started looking at two aspects so far:

- General layout to accommodate possible run 2 beam parameters
  - Small initial spot size
  - Higher possible energy
- Background reduction strategies

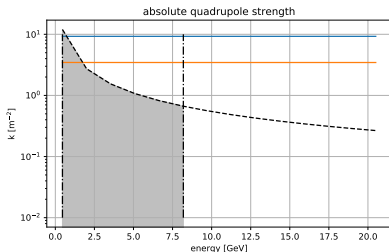
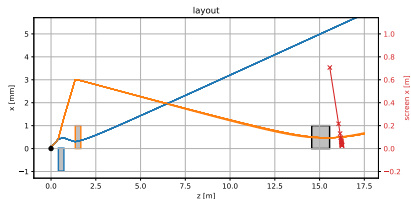


# Layout



- High magnification owing to small object–lens distance, large lens–image plane distance.
- Limited by space constraints (overall length, proximity of first quadrupole to end of plasma cell)

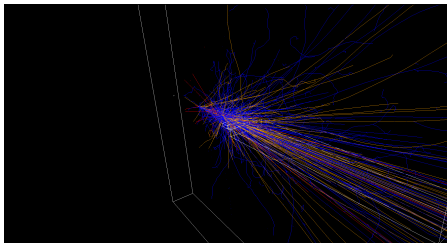
# Layout



- Also limited by strength of magnets → upgrade quadrupoles (what is feasible?)
- Upper energy limit for detection set by dipole strength/screen position (vertical lines on the above plot)

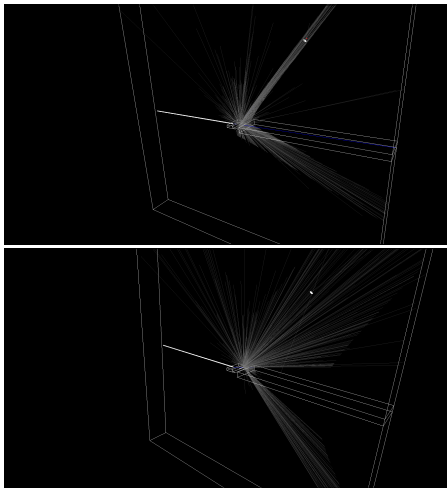
# Background

High background in spectrometer for run 2, since (much?) more material in the beam line.



- Need an idea of how bad it could be
- Reduce background by shifting spectrometer further downstream?
- Reduce background using different screen technology? Curved Cherenkov radiator could select by position and angle (instead of just position)

# Background



- Screen changes angle as a function of position along length, so that different part of the Cherenkov light cone escape, constraining detection by input angle as well as position

# Outlook

More work required on both aspects, but need some specifications to aim for. Generally,

- Stronger quadrupoles needed to increase the imaging range
- Quadrupoles should be near to plasma exit if large magnification is required
- Vacuum chamber for screen needs to be altered to accommodate high-energy end (or dipole upgrade)
- Background needs to be studied and (probably) mitigated.

Additionally, should study emittance measurement possibilities and improvements to optical line (or alternative screen readout technology).