IR2: opportunities for exclusive coherent processes on light nuclei

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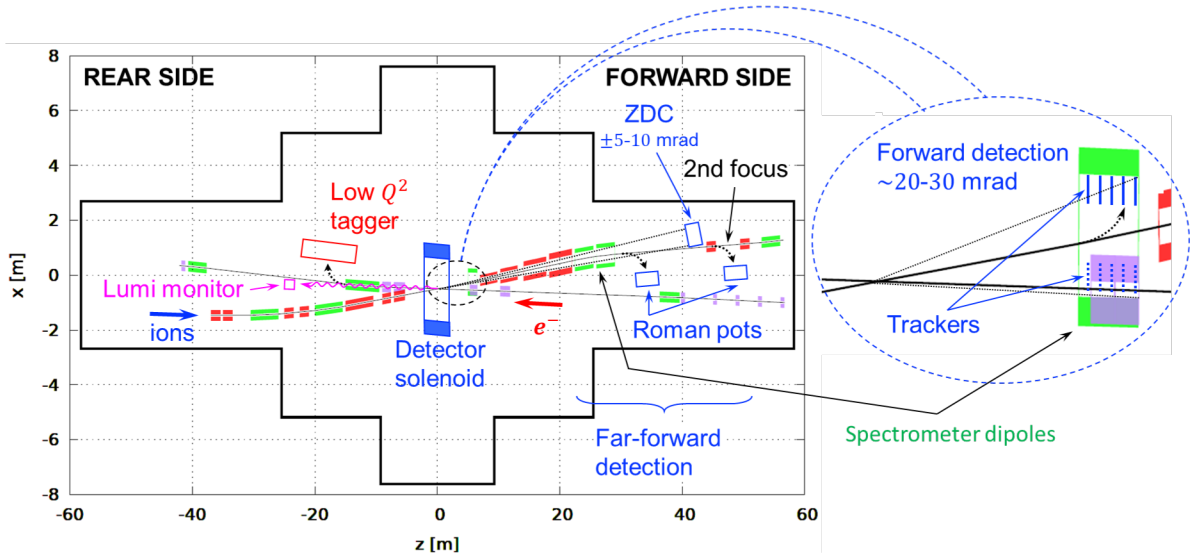
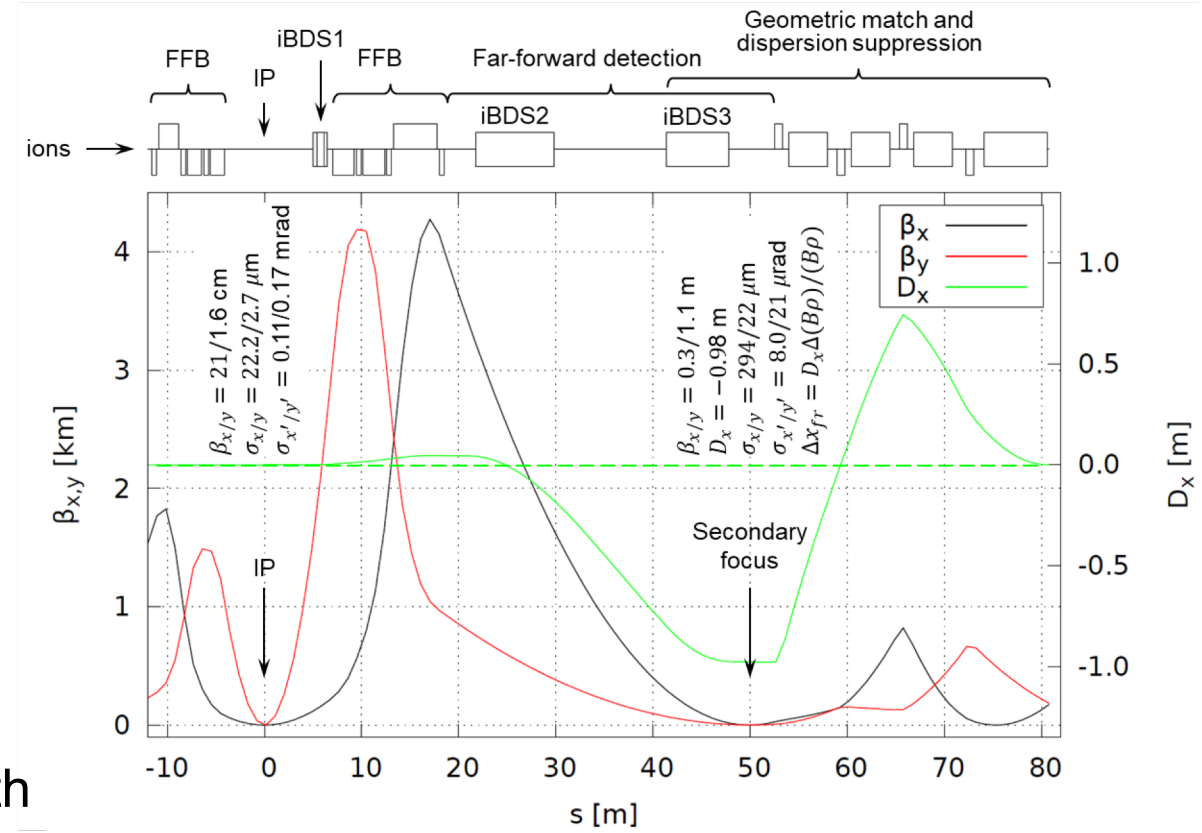
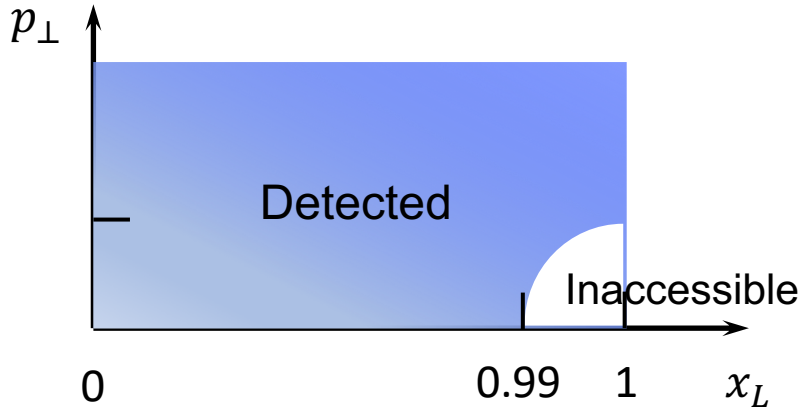
IR2: forward spectrometer



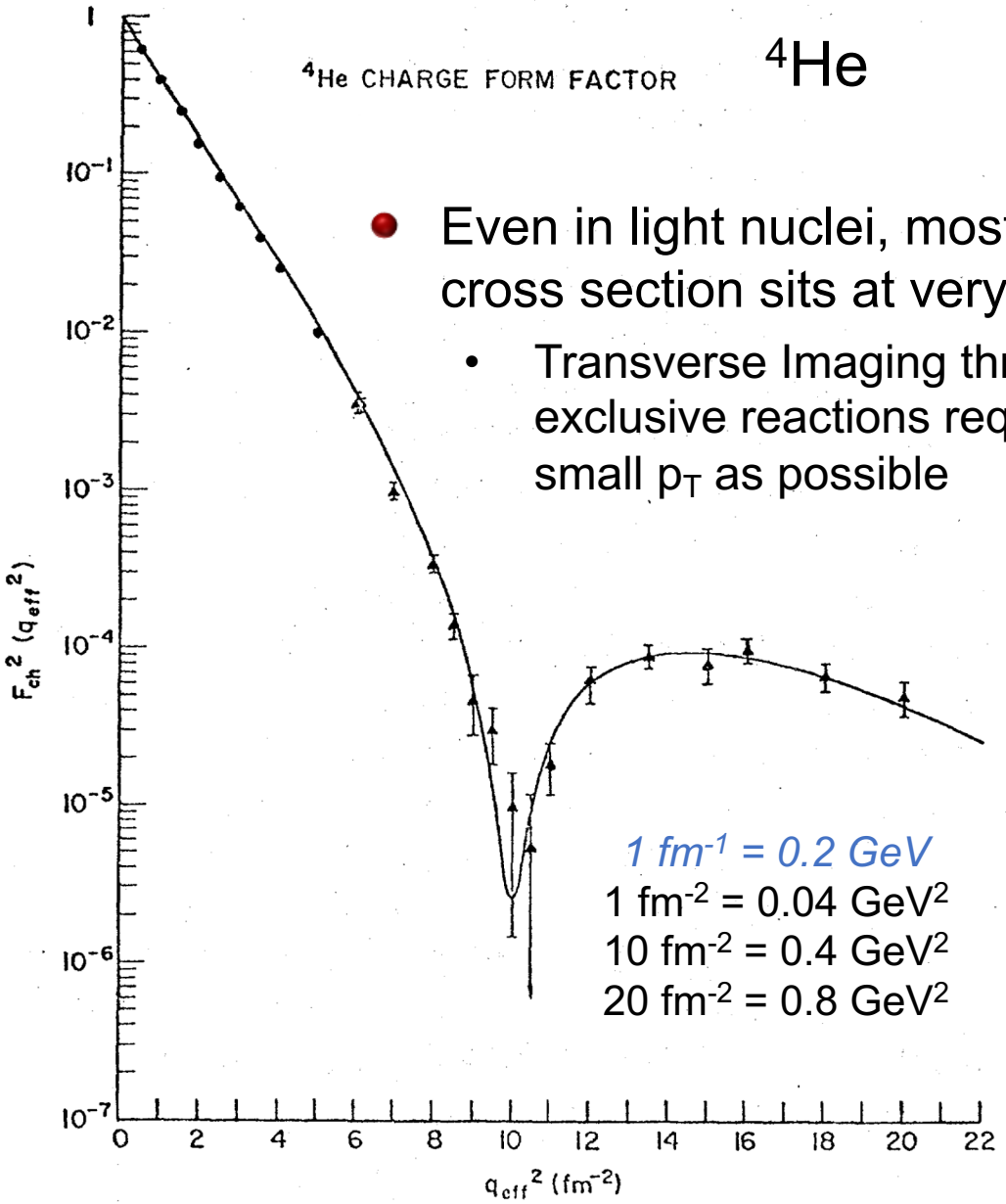


- Having the Roman pots in focus at a location with large dispersion creates an exceptional low-p_T acceptance over a wide range in x_L.

- For ions, the low-p_T acceptance scales (unfavorably) with A since a given momentum transfer to the nucleus produces a smaller change in angle and longitudinal momentum than for proton.



Exclusive coherent scattering on nuclei



^{4}He

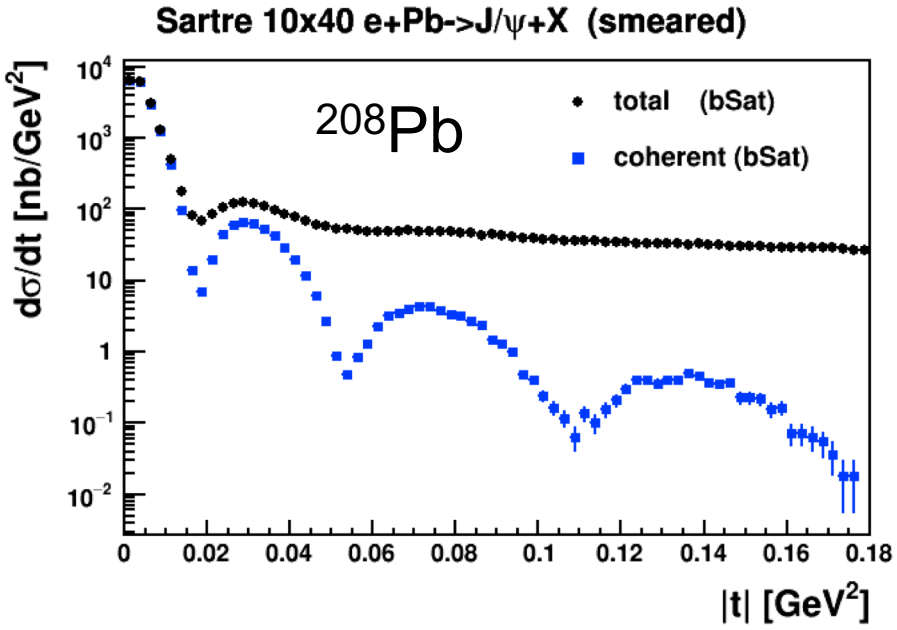
- Even in light nuclei, most of the coherent cross section sits at very low p_T.
  - Transverse Imaging through coherent exclusive reactions requires covering as small p_T as possible

1 fm^{-1} = 0.2 GeV

1 fm^{-2} = 0.04 GeV^2

10 fm^{-2} = 0.4 GeV^2

20 fm^{-2} = 0.8 GeV^2



- Coherent diffraction on light ions gives clean access to nuclear glue
  - Detection of final-state ion removes need for vetoing of incoherent backgrounds, which is very challenging
  - ”Oomph” factor for saturation is smaller by a factor of 3.7 for ^{4}He vs ^{208}Pb ($A^{1/3}$)

- A high luminosity is important for all c.m. energies.

Thank you!