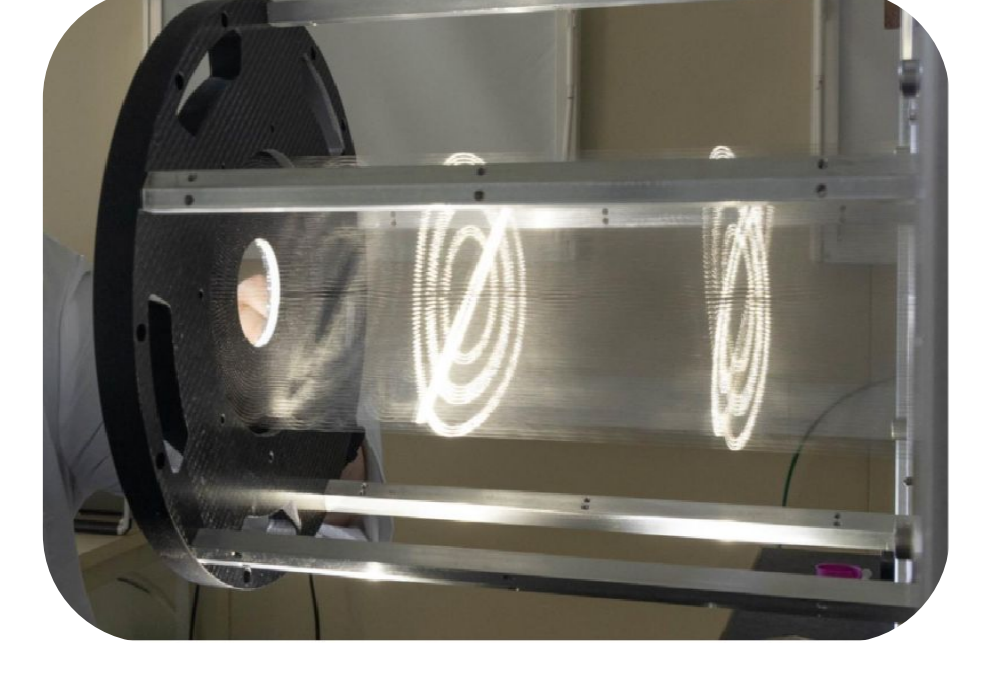
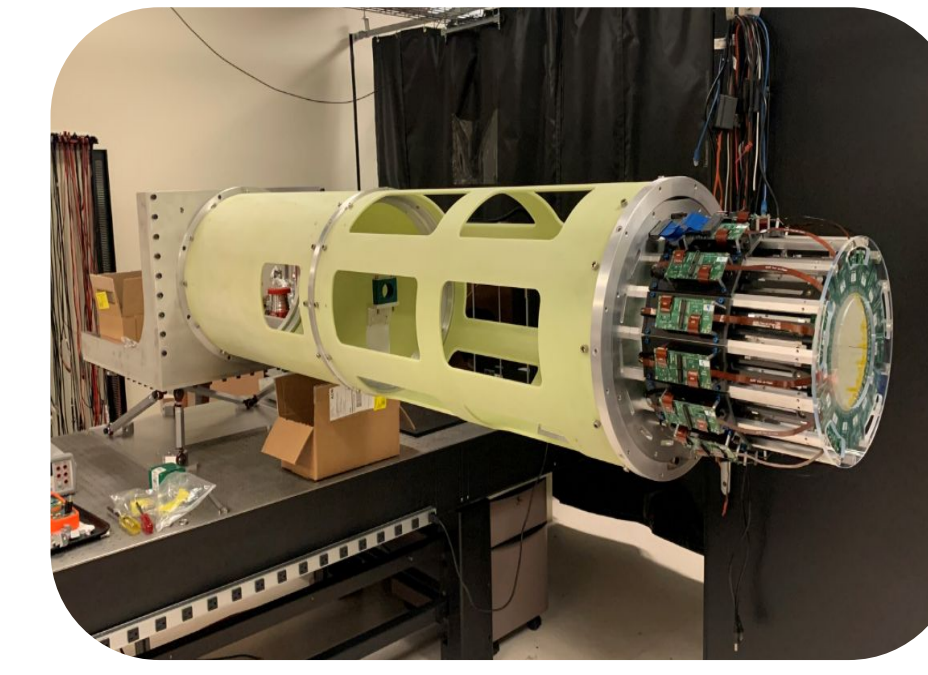


Experimental study of the strong interaction with the spectrometer CLAS and ALERT at JLab

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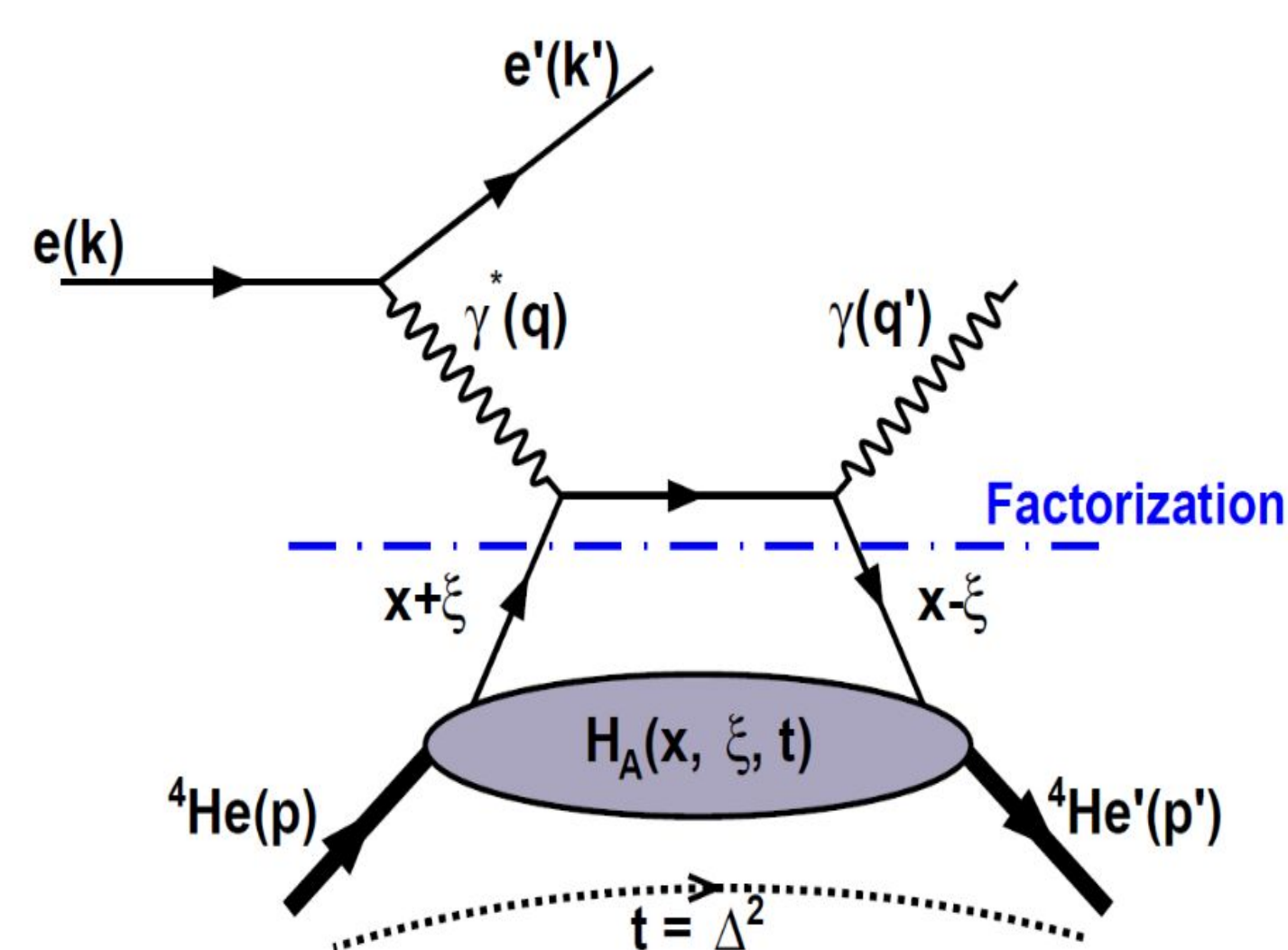


1 Introduction

- ALERT is an ongoing experiment at Jefferson Lab. It aims to enhance our understanding of the nuclear structure by achieving very sophisticated measurement on the ^4He nucleus.
- At the heart of the experiment is the new detector of the same name, ALERT, which stands for a low energy recoil tagger.
- The data taking of the experiment started in April 2025 and is scheduled for completion in September 2025.

3 Proposed measurement

- Deeply Virtual Compton Scattering on ^4He

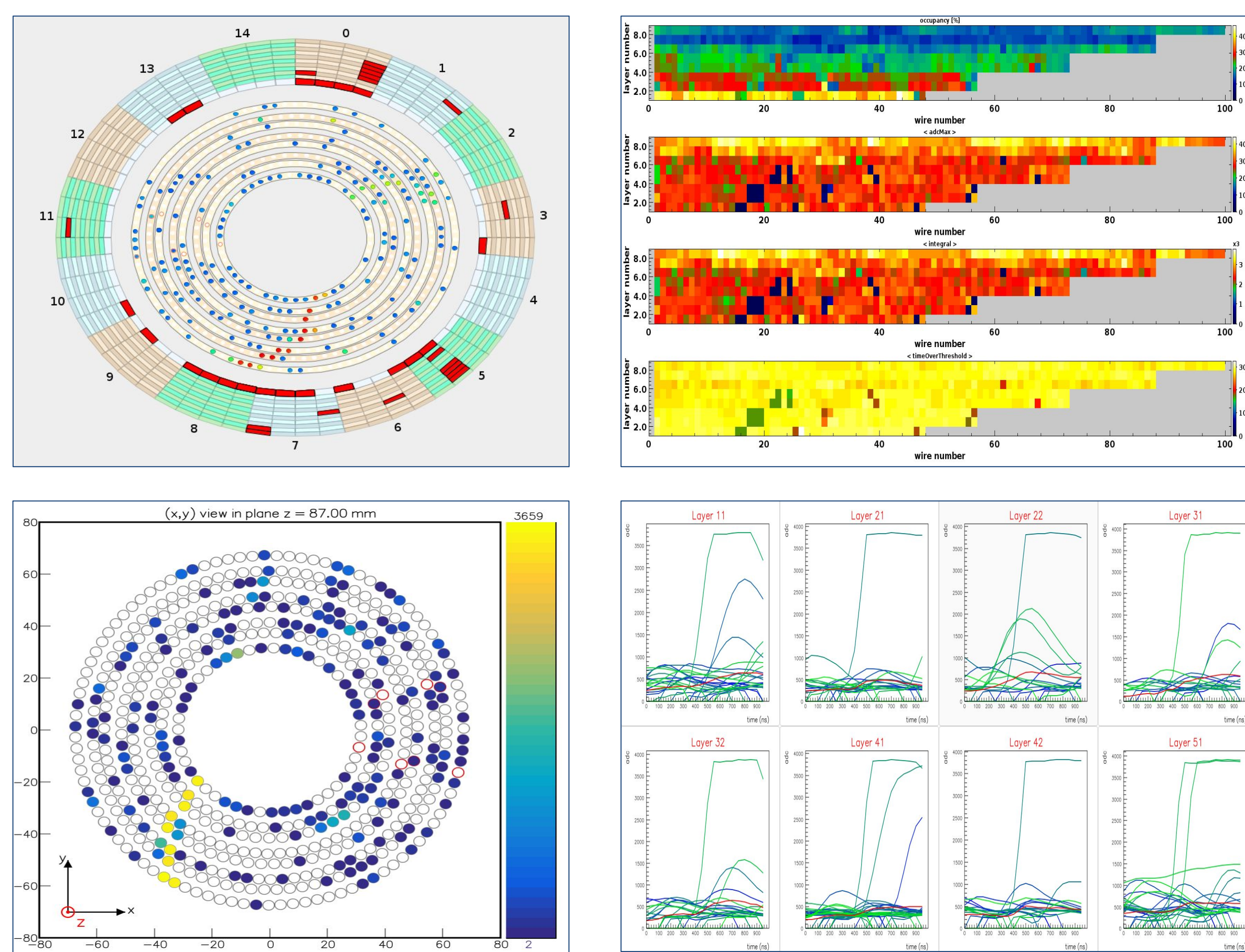


- GPD H_A ← Compton Form Factor \mathcal{H}_A ← Beam-spin asymmetry A_{LU}

$$A_{LU}(\phi) = \frac{d^5\sigma^+ - d^5\sigma^-}{d^5\sigma^+ + d^5\sigma^-}$$

5 Ongoing work

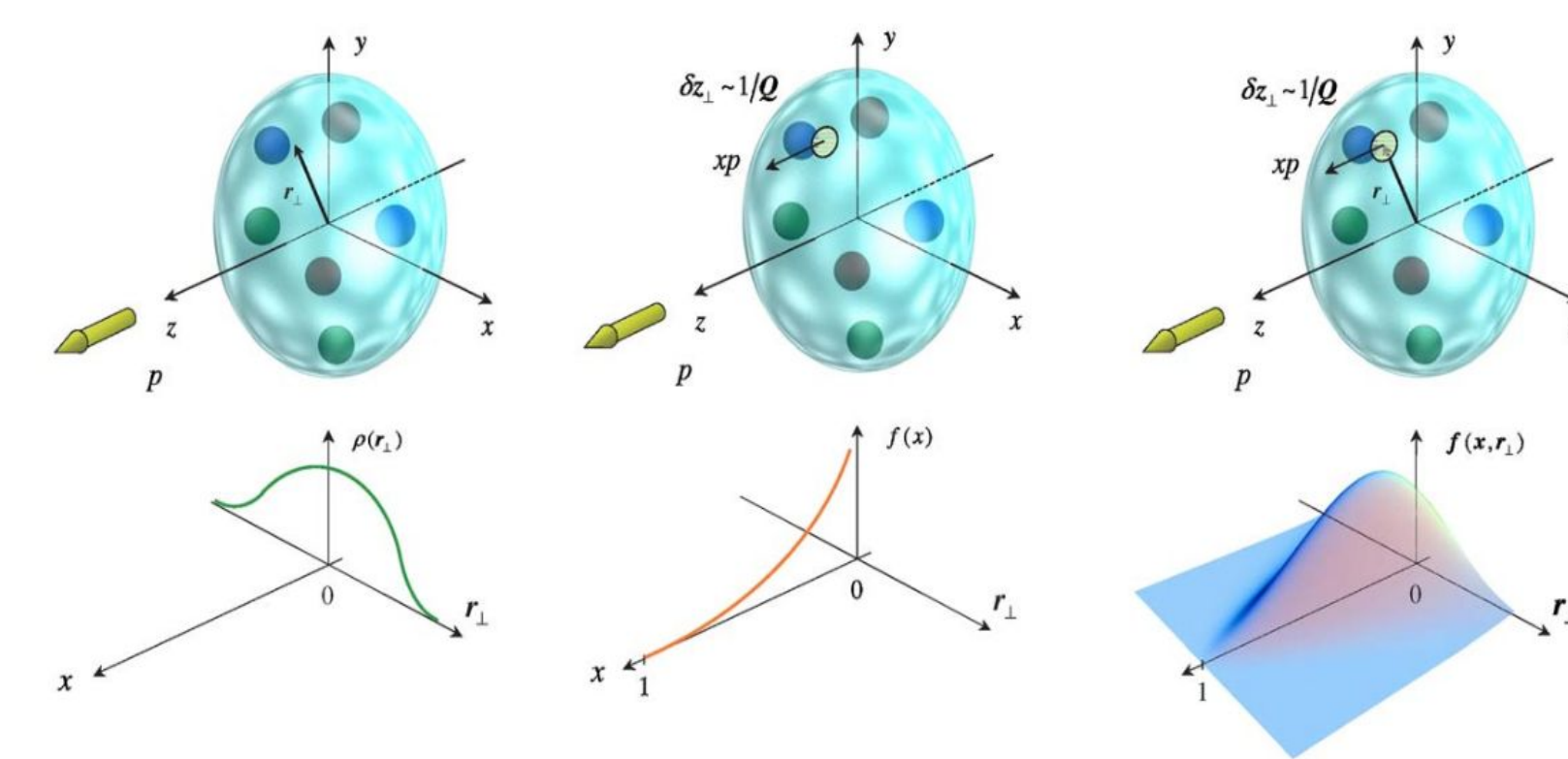
- Data taking, monitoring, software development, analysis



- ✓ Decoding, hit rejection, track reconstruction, calibration

2 Physics motivation

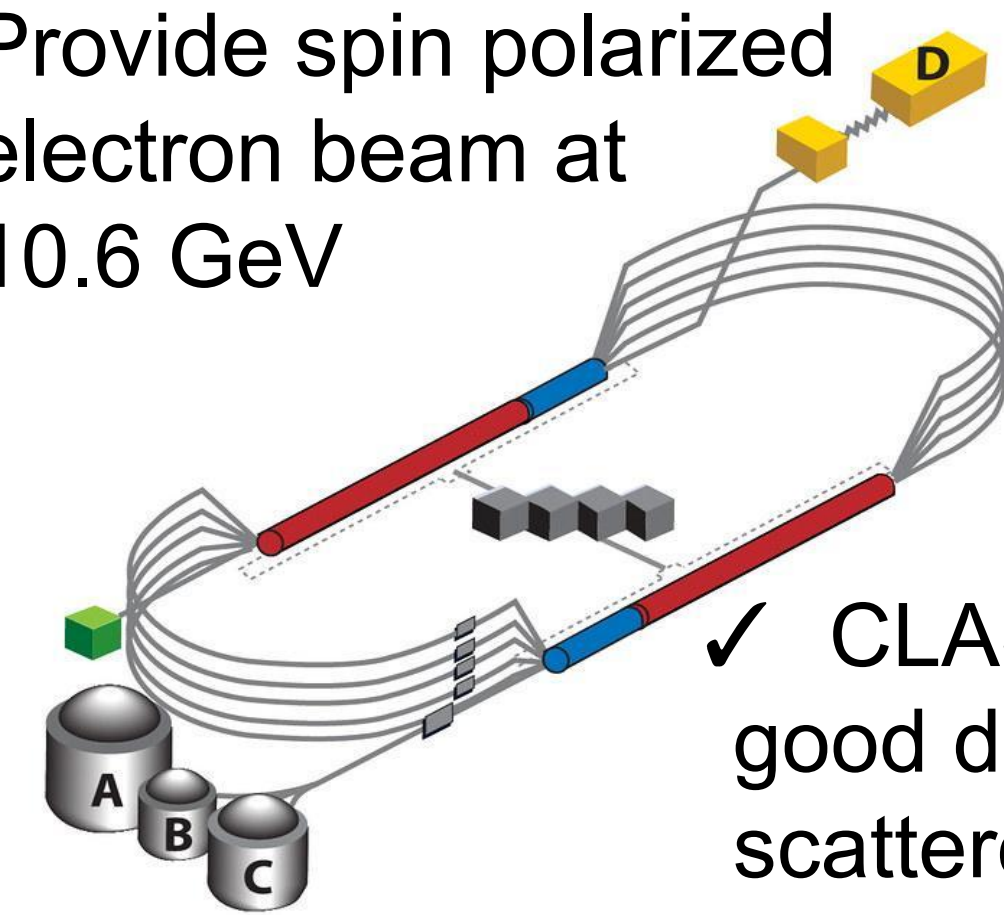
- Extract nuclear Generalized Parton Distributions (GPDs)
- Measurement on ^4He , because :
 - spin 0 nuclear target → only 1 chiral-even GPD, H_A
 - strong binding energy and high nuclear density
- Study of the EMC effect



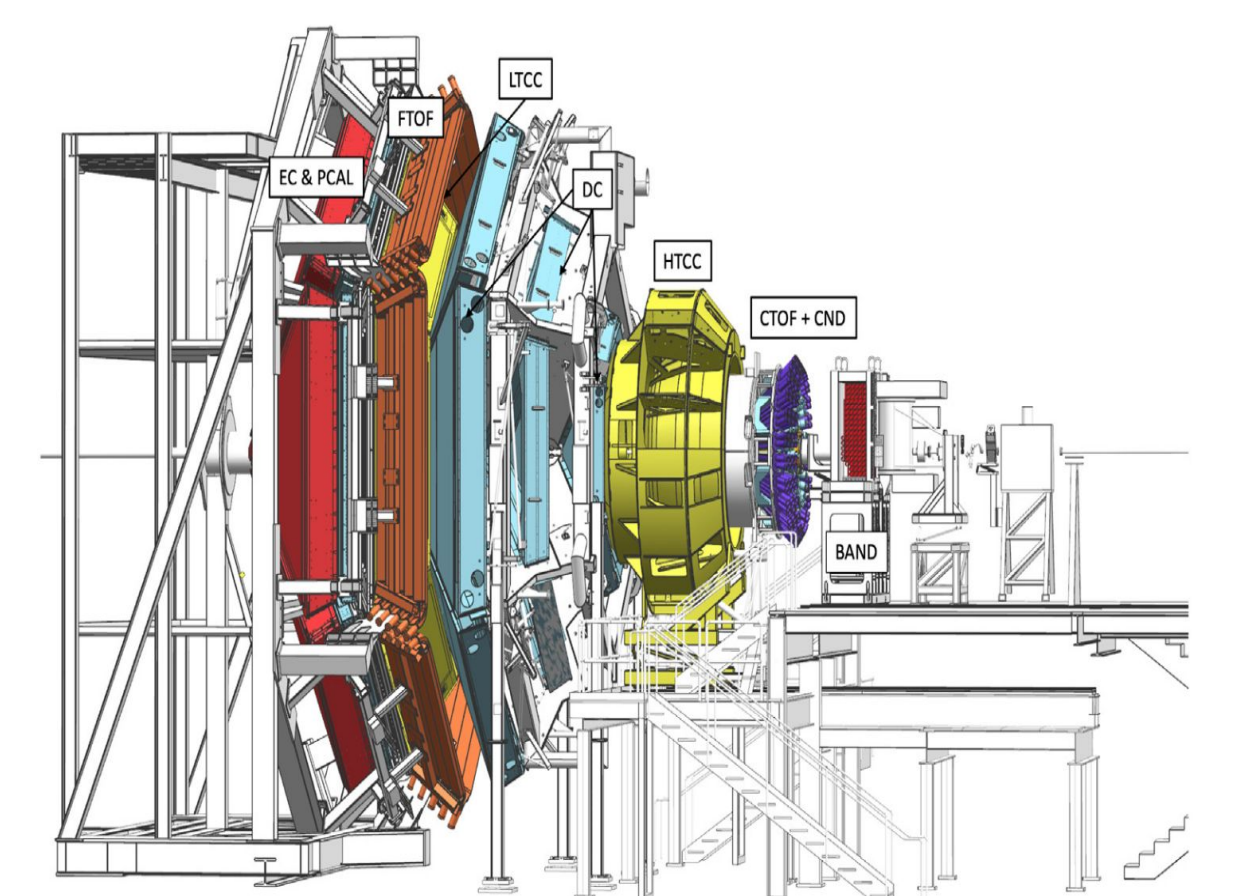
4 Experimental setup

- Continuous Electron Beam Accelerator Facilities (CEBAF)
- CEBAF Large Acceptance Spectrometer (CLAS)

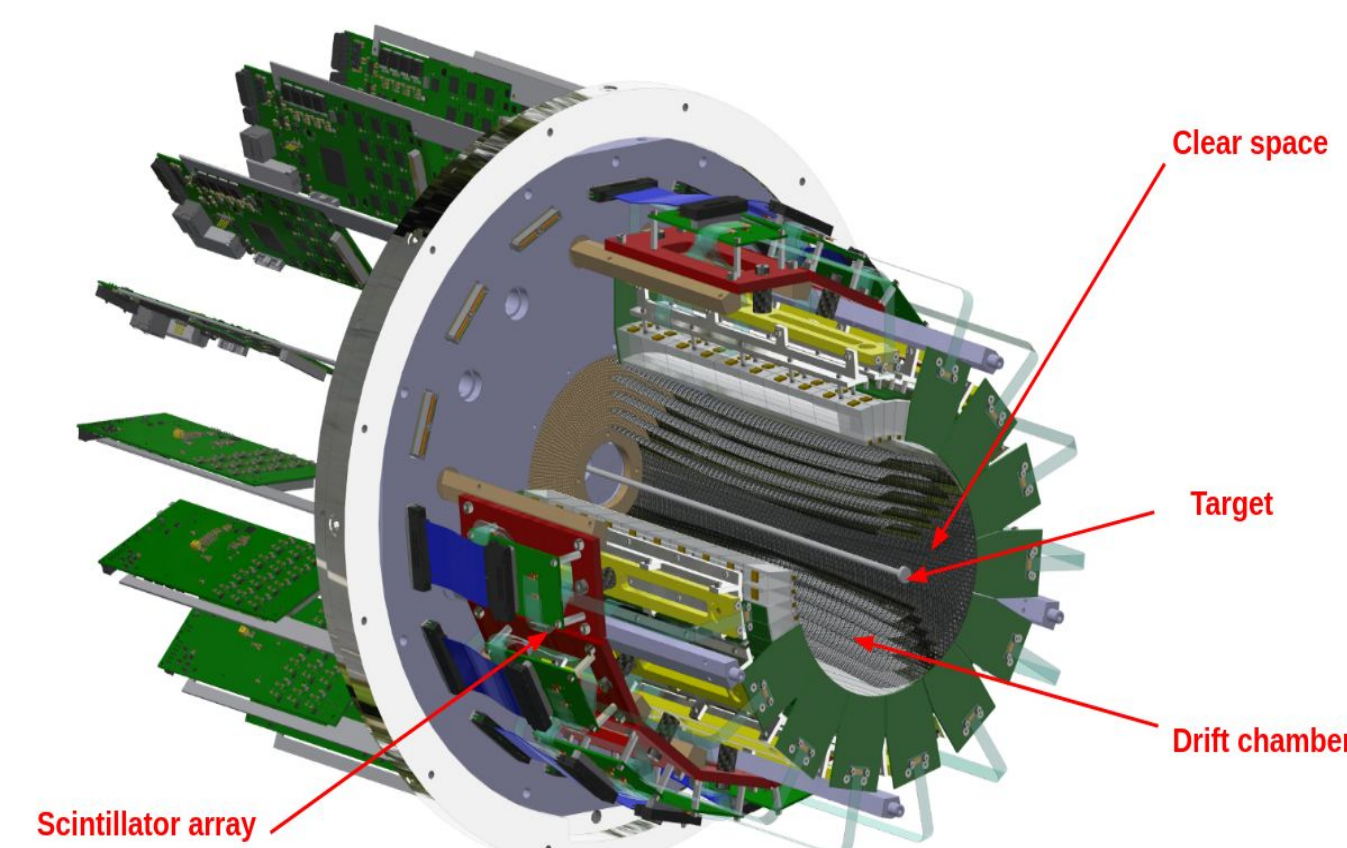
- ✓ Provide spin polarized electron beam at 10.6 GeV



- ✓ CLAS provides a good detection of the scattered electrons and produced photons



- ALERT



- ✓ Hyperbolic drift chamber (AHDC) + time-of-flight system (ATOF) track reconstruction + particle identification
- ✓ AHDC
 - 3026 aluminium wires, organized in 21 concentric layers around the beam axis, 2 mm apart
 - 512 sense wires, distributed over 8 layers
 - +10° or -10° stereo angle, 40 mm between the inner and the outer layers
- ✓ ATOF
 - cylindrical plastic scintillator array that is readout by SiPMs
 - 15 identical modules, each module consists of 4 scintillator "bars" and "wedges"
 - thickness bars (3 mm), wedges (2 cm)

6 Acknowledgements

