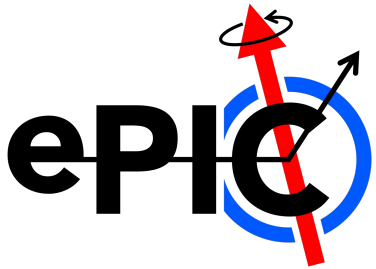
ePIC Collaboration Meeting 2026

Exclusive, Diffraction and Tagging Convener Report

Stephen and Kong

21st January 2026



The EDT Marathon

- For ~8 weeks, EDT PWG met weekly to push simultaneously on two fronts
- PreTDR (top set of four)
- Early science paper (bottom set of four)

Analyzers	Oct 27	Nov 3	Nov 10	Nov 17	Nov 24	Dec 1	Dec 8	Dec 15
Oliver & Jihee	Update	Post slides	Update	Post slides	Update	Post slides	Update	Summary
Maci	Update	Post slides	Update	Post slides	Update	Post slides	Update	Summary
Win	Update	Post slides	Update	Post slides	Update	Post slides	Update	Summary
Garry, A. Smith	Update	Post slides	Update	Post slides	Update	Post slides	Update	Summary
								Summary
Olaiya	Post slides	Update	Post slides	Update	Post slides	Update	Post slides	Summary
Jan, Alex Jentsch	Post slides	Update	Post slides	Update	Post slides	Update	Post slides	Summary
Hadi	Post slides	Update	Post slides	Update	Post slides	Update	Post slides	Summary
Stephen Kay	Post slides	Update	Post slides	Update	Post slides	Update	Post slides	Summary
								Kong & Stephen

- **A huge thank you to all of our analysers for their work in this period!**

PreTDR - EDT Updates

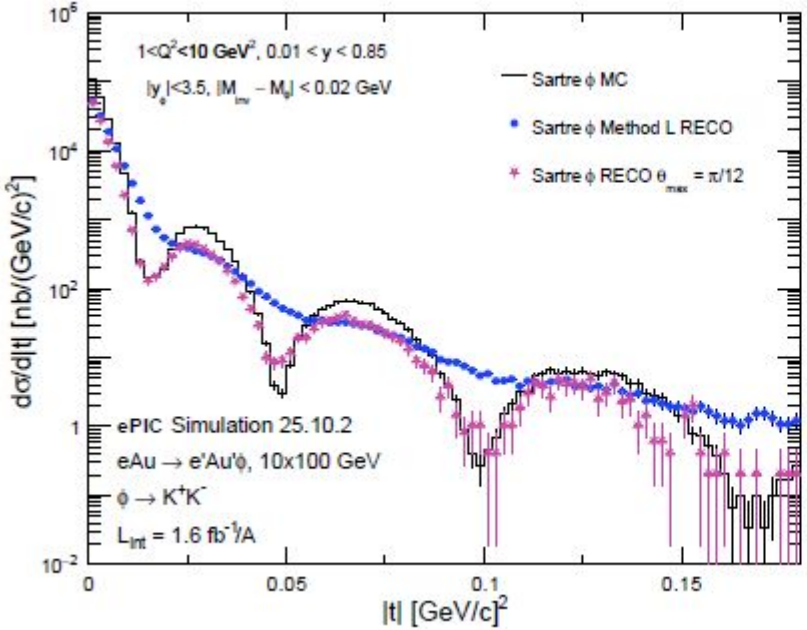
- Since the previous draft, a lot of re-ordering
  - Exclusive Physics moved, now Chapter 4
    - Section 4, Subsection 3
- General structure of our subsection not too different, but some changes
- Some key processes highlighted, and key detector performance

- **Old Structure**
  - DVCS
  - Upsilon
  - eA VM

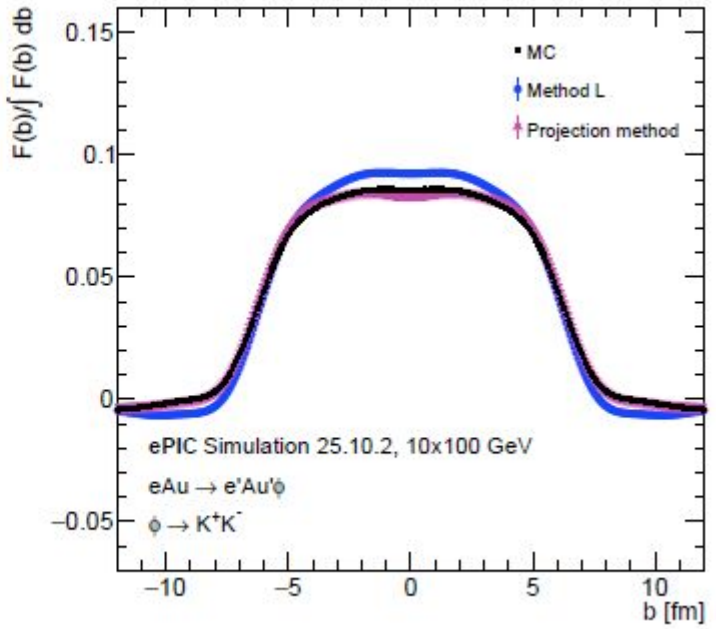
- **New Structure**
  - DVCS - Updated figures
  - DVπ^0P - DVCS BG - New!
  - Upsilon - Dropped!
  - eA VM - New conclusions!
  - ^{3}He Double Tagging - New!
  - TCS in Low Q^2 Tagger - New!
  - Sullivan Process - Neutral reconstruction in ZDC - New!

Early Science Paper

- Exclusiv
- Feed in
- **Direct ir**



(c) DVMP J/ψ



(d) DEMP

?

Results Release - Physics Forum December 2025

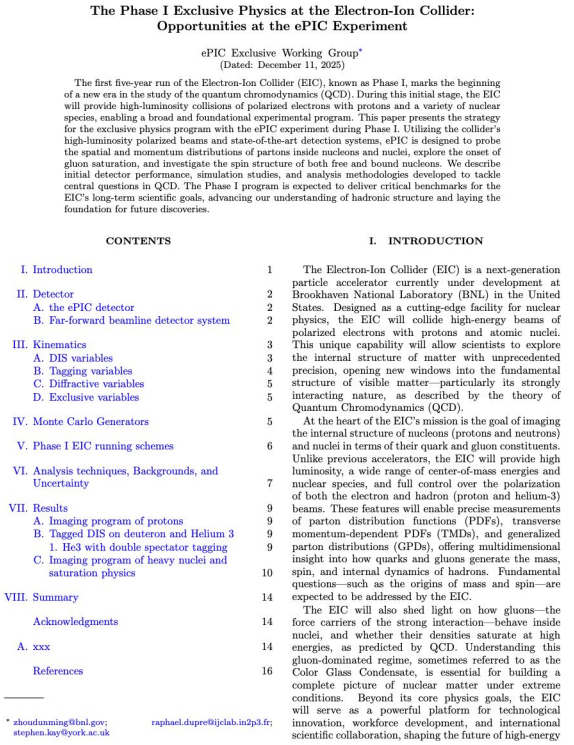
- Physics forum just before Christmas saw the release of several results from the WG - Analysis notes subsequently approved!
- Exclusive ϕ Production in eAu Collisions - Maci Kesler
  - Analysis note available
- Exclusive π^0 Production in ep Collisions - Jihee Kim
  - Analysis note available
- Inclusive measurements in e^3He collisions with double tagging - Win Lin
  - Analysis note available
  - Overlap with inclusive group
- **Congratulations to these (and all other analysers at the forum) for the successful release of their results!**

Future Results Release Session - Analyses Ready (or ready soon)

- The precedent has been set and people have led the way, other results are waiting to follow!
- Several other analyses within the group are either ready or nearly ready to formally release their results
- Deep Exclusive Meson Production, DEMP, from ep Collisions - Stephen Kay
  - Exclusive version of sullivan process -> provides access to meson structure (pion form factors in this case)
  - Analysis note draft complete and ready for review
  - Ready to go at next forum if note is acceptable
- Deeply Virtual Compton Scattering, DVCS, from ep Collisions - Oliver Jevons
  - Analysis and note at advanced stage, should be ready very soon
- Deeply Virtual Meson Production (J/ψ), DVMP, from ep Collisions - Olaiya Olokunboyo
  - Analysis also at a very advanced stage and ready for release soon

Plan for the New Year

- First priority is to get early science paper draft finished and internally reviewed
- Want to publish ASAP
- In parallel, can evaluate what material to port to the Early Science Report
- The hard work in terms of analysis has been done, a few outstanding items
  - Machine background - impacts
  - Some analyses to dig into a little more
- Early science configurations are already in the production workflow for many EDT processes
  - Identify anything missing
- Then, the full TDR



The Phase I Exclusive Physics at the Electron-Ion Collider: Opportunities at the ePIC Experiment

ePIC Exclusive Working Group*
(Dated: December 11, 2025)

The first five-year run of the Electron-Ion Collider (EIC), known as Phase I, marks the beginning of a new era in the study of the quantum chromodynamics (QCD). During this initial stage, the EIC will provide high-luminosity collisions of polarized electrons with protons and a variety of nuclear species, enabling a broad and foundational experimental program. This paper presents the strategy for the exclusive physics program with the ePIC experiment during Phase I. Utilizing the collider's high-luminosity polarized beams and state-of-the-art detection systems, ePIC is designed to probe the spatial and momentum distributions of partons inside nucleons and nuclei, explore the onset of gluon saturation, and investigate the spin structure of both free and bound nucleons. We describe initial detector performance, simulation studies, and analysis methodologies developed to tackle central questions in QCD. The Phase I program is expected to deliver critical benchmarks for the EIC's long-term scientific goals, advancing our understanding of hadronic structure and laying the foundation for future discoveries.

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I. INTRODUCTION

The Electron-Ion Collider (EIC) is a next-generation particle accelerator currently under development at Brookhaven National Laboratory (BNL) in the United States. Designed as a cutting-edge facility for nuclear physics, the EIC will collide high-energy beams of polarized electrons with protons and atomic nuclei. This unique capability will allow scientists to explore the internal structure of matter with unprecedented precision, opening new windows into the fundamental structure of visible matter—particularly its strongly interacting nature, as described by the theory of Quantum Chromodynamics (QCD).

At the heart of the EIC's mission is the goal of imaging the internal structure of nucleons (protons and neutrons) and nuclei in terms of their quark and gluon constituents. Unlike previous accelerators, the EIC will provide high luminosity, a wide range of center-of-mass energies and nuclear species, and full control over the polarization of both the electron and hadron (proton and helium-3) beams. These features will enable precise measurements of parton distribution functions (PDFs), transverse momentum-dependent PDFs (TMDs), and generalized parton distributions (GPDs), offering multidimensional insight into how quarks and gluons generate the mass, spin, and internal dynamics of hadrons. Fundamental questions—such as the origins of mass and spin—are expected to be addressed by the EIC.

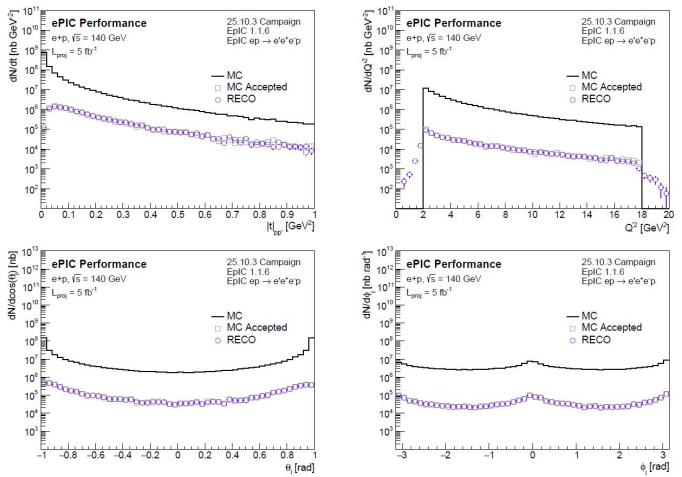
The EIC will also shed light on how gluons—the force carriers of the strong interaction—behave inside nuclei, and whether their densities saturate at high energies, as predicted by QCD. Understanding this gluon-dominated regime, sometimes referred to as the Color Glass Condensate, is essential for building a complete picture of nuclear matter under extreme conditions. Beyond its core physics goals, the EIC will serve as a powerful platform for technological innovation, workforce development, and international scientific collaboration, shaping the future of high-energy

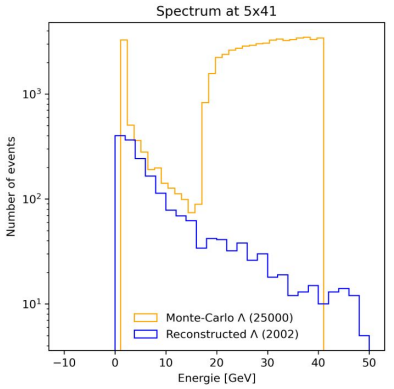
Tasks Going Forward

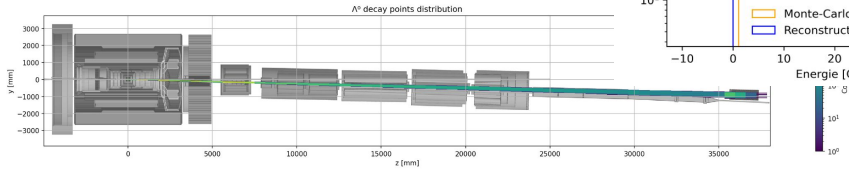
- Machine background samples have been processed and need analysing
  - DVCS and DVπ^0p samples available
  - **Under analysis now**
  - **Need to quantify impact and add a comment on this to paper**
- Need more realistic PID in many cases
  - Incorporate this as we can
- **Should also try to utilise timing information**
  - Once available and understood, could be powerful for some analyses
- Ensure analyses are properly documented and **code is backed up/publicly available on GitHub**
  - Upsilon analysis likely to be dropped from PreTDR
  - Code not easily available so analysis could not be reproduced in latest simulation campaign
- **Keep momentum of the past few months going!**

New/Updated Analyses

- TCS and DDVCS - Gary Penman
  - Very quick progress on TCS studies just before Christmas
  - Study ongoing and will get further updates
  - Study was ready for input to the PreTDR to showcase Low-Q^2 tagger
- Sullivan Process - Baptiste Fraïsse
  - Meson Structure WG
  - Kaon structure functions
  - Recent progress and advancements in FF Λ reconstruction
  - Two talks in the Friday EDT workfest







EDT Workfest - Friday 23rd January

- EDT specific workfest is **Friday (23rd Jan) Afternoon 13:00-17:00 ET**
  - https://indico.bnl.gov/event/30532/sessions/8781/#20260123
- Mix of updates on analyses in the PreTDR/Early Science Paper and new analyses/topics
- Analysers have been asked to look forward and consider what's next for their analysis
  - Identify any topics they think need to be addressed to move forward
- Timed to enable discussion after each talk, and a broader group discussion
- Please come and join us at this session if you're able to do so
- All are welcome!
- Not on the schedule but have a new topic or idea?
  - **Please come along and share it in the discussion!**

Summary

- Exclusive, Diffraction and Tagging PWG is very active
  - Just finished a period of intense activity on the PreTDR and an EDT specific early science paper
  - Early science paper available for comments
- The work doesn't stop!
  - Still a lot to do and new deadlines approaching fast
- **Early science report - In a good position due to work on paper!**
- Key topics to work on going forward - shared across many PWG
- Several analyses ready/nearly ready for results release in near future
- Always welcome new topics and ideas
- Please join our Workfest on Friday Afternoon if you can!
- Also, please feel free to join our regular, biweekly meetings
  - Every other Monday 11:30 ET
  - **Next meeting - 26th January**

Thanks!
Any questions?