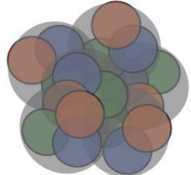


Hadron Physics / QCD

Scientific Working Group Discussion

C I N P



I C P N

Canadian Institute of Nuclear Physics

Institut canadien de physique nucléaire

Svetlana Barkanova, Town Hall Meeting, June 13, 2025

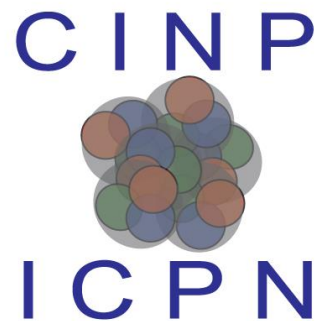
Submitted to the CINP Long-Range Plan Brief Committee Hadronic Physics/QCD Experiment, June 2025:

Experimental Probes of Hadron Structure at Jefferson Lab

G.M. Huber, Z. Papandreou, A. Teymurazyan, Department of Physics, University of Regina, Regina, SK, D. Hornidge, Department of Physics, Mount Allison University, Sackville, NB

Hadron Polarizability Experiments at Mainz and Duke, *D. Hornidge (NOI)*

Canadian Participation in the Electron-Ion Collider, *W. Deconinck*



Tooba Ali* (University of Manitoba), Tegan Beattie (University of Regina), Sanaa Cheikh* (Mount Allison University), Wouter Deconinck (University of Manitoba), Halen Davies* (University of Regina), Michael Gericke (University of Manitoba), Dave Hornidge (Mount Allison University), Garth Huber (University of Regina), Tobias Junginger (University of Victoria), Maggie Kerr* (Mount Allison University), Oliver Kester (TRIUMF), Robert Laxdal (TRIUMF), Savino Longo (University of Manitoba), Juliette Mammei (University of Manitoba), Zisis Papandreou (University of Regina), Love Preet* (University of Regina), Bardh Quni* (University of Manitoba), Shefali* (University of Manitoba), Tomas Sosa Giraldo* (University of Manitoba), Aram Teymurazyan (University of Regina), Akshaya Vijay* (University of Manitoba), Awais Bin Zahid* (University of Regina).

JLab Brief Recommendations

1. **Substantial investments** in detector and software infrastructure; finally seeing high quality new data. Experiments are costly to run, require massive amounts of beam time; PI and students need to be on-site; data analysis takes years. Unless we receive sufficient operating funds to support the our HQP as well for data taking, analysis and dissemination of results, our leadership and impact in these experiments will be lost.
2. The research direction “**From quarks and gluons to nuclei**” should include Canadian participation in the **JLab 12 GeV** program as a major strategic scientific opportunity.
3. **SoLID** will be a JLab flagship project once it is completed early next decade, and should be listed as a new project of high strategic significance within the research direction “From quarks and gluons to nuclei”.
4. Longer term, the JLab positron and **22 GeV beam upgrades** provide many novel scientific opportunities. This should be listed as one of the future scenarios of significance to Canadian subatomic physics.

EIC Brief Recommendations

1. The research direction “**From quarks and gluons to nuclei**” should include Canadian participation in the construction and exploitation of the Electron-Ion Collider and its primary ePIC detector, as a flagship project.
2. The **broad physics outcomes** of the Electron-Ion Collider present opportunities for engagement from many fields in subatomic physics research.
3. In large international collaborations, the Canadian subatomic physics community has a unique responsibility to ensure that the values of **equity, diversity, and inclusion** are promoted, in particular where other collaborators are unable to do so.
4. An increase in the subatomic physics envelope associated with a concerted effort at **increasing student stipends** would ensure that we can compensate students at the levels they deserve.
5. **Predictable CFI Innovation Fund timelines** are essential to allow planning for submissions in the context of large international collaborations.

Mainz Brief Recommendations

(made up by Barkanova for now, waiting for the brief)

Continue work with the A2 Collaboration to advance our understanding of nucleon internal dynamics, electromagnetic structure, and low-energy QCD.

Provide **critical validation data for theoretical frameworks** such as Chiral Perturbation Theory, dispersion relations, and lattice QCD.

Increase Canadian participation in MESA's MAGIX, P2, and DarkMESA experiments (hadronic, nuclear, and dark sector physics)

Showcase the integration of Canadian talent at MESA as a stepping stone for wider international research synergy (e.g. with EIC).

CINP LRP 2020 – Theory in the beginning of every physics section.

Do we want to keep this structure?

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Discussion:

Interface/Synergy – Experiment/Theory

Interface/Synergy - JLab/Mainz/EIC

Mid-term outlook (2027-2034)

Long-term vision (2034-2041)

