Positron Working Group Workshop

March 18th-20th, 2024

The George Washington University

D. Higinbotham[1], A. Schmidt[2], E. Voutier[3], X. Zheng[4]

and the **Jefferson Lab Positron Working Group**

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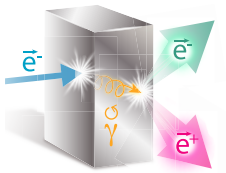
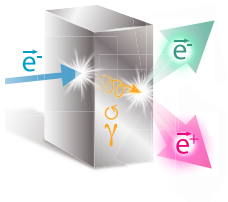


❖ Multi-photon effects and Generalized Parton Distributions have been **recognized** as the golden physics cases of the Jefferson Lab Positron Upgrade.

NUMBER	TITLE	PHYSICS THEME	CONTACT PERSON	HALL	DAYS AWARDED	SCIENTIFIC RATING	PAC DECISION
PR12+23-002	Beam Charge Asymmetries for Deeply Virtual Compton Scattering on the Proton at CLAS12	GPDs	Eric Voutier	B	100	**A-**	**C1**
PR12+23-003	Measurement of Deep Inelastic Scattering from Nuclei with Electron and Positron Beams to Constrain the Impact of Coulomb Corrections in DIS	TPE	Dave Gaskell	C	9.3	**A-**	**C1**
PR12+23-006	Deeply Virtual Compton Scattering using a positron beam in Hall C	GPDs	Carlos Muñoz Camacho	C	137	**A-**	**C1**
PR12+23-008	A Direct Measurement of Hard Two-Photon Exchange with Electrons and Positrons at CLAS12	TPE	Axel Schmidt	B	55	**A**	**C1**
PR12+23-012	A measurement of two-photon exchange in unpolarized elastic positron–proton and electron–proton scattering	TPE	Michael Nycz	C	56	**A-**	**C1**

There is still a lot to explore, quantify, and validate.



Physics status

- p-GPs – LOI12+23-001

  Measurement of the generalized polarizabilities of the proton with positron and polarized electron beams

  N. Sparveris

- Axial form factor – LOI12+23-002

  The axial form factor of the nucleon from weak capture of positrons

  D. Dutta

- Dark Bhabha – LOI12+23-005

  A hopefully amplitude-level search for a Dark Photon in Bhabha scattering

  D. Mack

- TPE in polarization transfer – LOI12+23-008

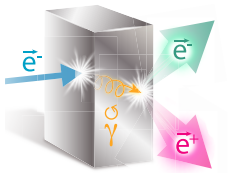
  Polarization transfer in positron-proton elastic scattering

  A. Puckett, J.C. Bernauer, A. Schmidt

- Dispersive effects in DIS – LOI12+23-015

  Energy dependence of dispersive effects in unpolarized inclusive elastic electron/positron-nucleus scattering
  the impact of Coulomb correct

  P. Gueye, J. Arrington, P. Giuliani, D. Higinbotham



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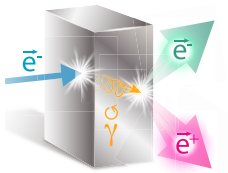
Missing

- Polarized target opportunities
- Tests of the Standard Model
- Electroweak processes
- Experimental program at LERF
- Novel ideas



❖ The JLab PWG offers **review** to the new experimental proposals looking for **PWG Endorsement** at PAC52.

Schedule

- Send title and short description by March 29th
- Send proposal by April 15th 1pm EDT
- Review due on April 22nd 1pm EDT
- Endorsement decision due on April 26th 1pm EDT

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https://www.institut-pascal.universite-paris-saclay.fr/en

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Joint Multidimensional Hadron Structure (**MDHS**)
and Jefferson Lab Upgrades (**JPhys++**)
brainstorming program at the Institut Pascal

October 21st – November 8th, 2024
(tentative schedule)

The **Institut Pascal** of the **University of Paris-Saclay** is offering infrastructure and funding support to hold the joint MDHS & JPhys++ program which will address the ***theoretical challenges of hadron structure*** and the ***benefits of the CEBAF Positron and Energy Upgrades***.

- What are the best strategies to extract GPDs and TMDs from experiments ?
- What can be learned about TMD evolution with the Jefferson Lab Upgrades ?
- What Jefferson Lab Upgrades can reveal about the emergence of hadron mass ?
- …