

Positron Working Group

News Letter

<http://wiki.jlab.org/pwggwiki>

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Please contact the coordinator of the topic of your interest.

Following the JPos17 International Workshop on Physics with Positrons at Jefferson Lab [1] and the presentation of a Letter-of-Intent [2] to PAC46, the effort for a positron experimental program at JLab continues to progress. The 2020 prospects are: a full positron proposal for PAC48, a positron White-Paper for positron beams and physics at JLab, and a contribution to the Yellow Report process for positron physics at eRHIC. Groups are building up and are looking for your contribution.

1 e^+ @PAC48

In the line of PAC46 recommendations [3], we wish to propose to PAC48 indisputable high-impact physics case experiments supporting the development of polarized positron beams at CEBAF. With the expectation of significant experimental signals and a strong physics output, Deeply Virtual Compton Scattering off the proton (p-DVCS) is the golden physics case for positron beams. Based on the PAC46 Letter-of-Intent, we consequently intend to submit two proposals: high precision measurements of selected unpolarized cross sections with the NPS (Neutral Photon Spectrometer) in Hall C, and a wide kinematical survey of moderate precisions measurements of cross sections and beam spin asymmetries with CLAS12. In addition, groups from the Accelerator, Engineering, and EHS&Q divisions will be asked to consider the technical issues and resources required to develop and build a positron source at the CEBAF injector, for operating the accelerator in the positive polarity, and providing low current positron beams up to 12 GeV with high quality. The intent is to provide a report in advance of PAC48 to support the proposals. Contact the coordinator of the group of your interest (Tab. 1) for contributing to these developments.

<i>Topic</i>	<i>Coordinator</i>	<i>e-mail</i>
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e^+ -beam	J. Grames	grames@jlab.org

Table 1: Topics and respective coordinators for PAC48 proposals.

2 e⁺@JLab

The physics program accessible to a positron beam at CEBAF energies is rich with a variety of possible experiments [1, 2] addressing, in addition to DVCS, Two Photons Exchange (TPE) physics, potential physics scenarios beyond the Standard Model (pBSM), and other reaction channels where understanding would benefit of a comparison between electron and positron probes. These different possibilities will be collected into a Positron White Paper (PWP) which will be made publicly available by the PAC meeting. We are asking every person interested in the study of a specific physics channel with a positron beam at JLab, to contribute to the PWP with a description of their ideal experiment in no more than 4 pages. Proposals should expect a baseline of unpolarized positron beams with 1 μA maximum intensity, and polarized positron beams with 100 nA with a minimal polarization of 40%. As the conceptual design of the source and integration develop, efforts will be made to increase these values. The templates are available on the Positron Working Group wiki page under the Working Groups item. Send your contribution to the coordinator of your group of interest by the end of April.

<i>Topic</i>	<i>Coordinator</i>	<i>e-mail</i>
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Table 2: Topics and respective coordinators for the positron White-Paper.

3 e⁺@eRHIC

Coordinator: voutier@jlab.org

Although positron beams are not part of the baseline design of the Electron-Ion Collider (EIC), they would definitely enhance the physics reach of the EIC. Particularly, they are mandatory for the unambiguous understanding of the DVCS process and the extraction of the Compton form factors. The EIC User Group recently launched the Yellow Report Initiative [4] with the aim of quantifying physics measurements and implications for detector design. In that respect, we wish to develop the DVCS physics case for unpolarized and polarized positron beams at EIC. Please let us know if you are interested to contribute to these studies.

References

- [1] Proc. of the International Workshop on Physics with Positrons at Jefferson Lab (JPos17), Edts. J. Grames and E. Voutier, AIP Conf. Proc. **1970** (2018).
- [2] J. Grames, E. Voutier *et al.*, Jefferson Lab **LOI12-18-004** (2018); arXiv:1906.09419 (2019).
- [3] https://www.jlab.org/exp_prog/PACpage/PAC46/PAC46_Report_FINAL.pdf
- [4] <http://www.eicug.org/web/content/yellow-report-initiative>

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