

Report on the JSA Initiatives Fund Program project

# Workshop on High-Intensity Photon Sources (HIPS2017)

6th - 7th February, 2017  
Catholic University of America, Washington , DC, U.S.A.

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## 1 Introduction

This workshop aimed at producing an optimized photon source concept with potential increase of scientific output at Jefferson Lab, and at refining the science for hadron physics experiments benefitting from such a high-intensity photon source. The workshop brought together the communities directly using such sources for photo-production experiments, or for conversion into  $K_L$  beams. The combination of high precision calorimetry and high intensity photon sources greatly enhances scientific benefit to (deep) exclusive processes like wide-angle and time-like Compton scattering. Potential prospects of such a high-intensity source with modern polarized targets were also discussed. The availability of  $K_L$  beams would open new avenues for hadron spectroscopy, for example for the investigation of "missing" hyperon resonances, with potential impact on QCD thermodynamics and on freeze-out both in heavy ion collisions and in the early universe.

## 2 Workshop Organization

The workshop took place at The Catholic University of America on February 6-7, 2017 (<https://www.jlab.org/conferences/HIPS2017/>). The organizing committee consisted of:

- T. Horn (CUA)
- C. Keppel (Jefferson Lab)
- C. Munoz-Camacho (IPN-Orsay)
- I. Strakovsky (GWU)

### 3 Budget

The workshop was supported by the JSA Initiatives Fund Program at the level of \$2,500, which was used for supporting 13 young scientists and students (Registration fees: \$720, Lodging: \$1234, Transportation: \$545): Darshana Perera (UVa), Jixie Zhang (UVa), Hashir Rashad (ODU), Maxim Mai (GWU), Lee Alison (ODU), Chan Kim (GWU), Salina Ali (CUA), Rakitha Beminiwattha (LaTech), Marco Carmignotto (CUA), Richard Trotta (CUA), Rishabh Uniyal (CUA), Andres Vargas (CUA), Arthur Mkrtychyan (CUA).

### 4 Workshop Summary

The workshop consisted of 19 talks and discussion and summary sessions. A detailed list of the talks can be found on the workshop web page. The workshop was attended by about 45 participants from 20 institutions, some of them international. More than 30% of the participants were young scientists or students showing that this field is interesting and has growing importance.

The main focus of the workshop was on producing an optimized photon source concept with potential increase of scientific output at Jefferson Lab. The main topics included:

- New Opportunities with High-Intensity Photon Sources
- Optimized Photon Source and Science Opportunities

Within each topic the presentations addressed the fundamental questions, impact and scope of theory and experiment.

Overall, the workshop captured the excitement about prospects with a high intensity photon source with many lively discussions and an emerging concept of an optimized photon source design. The latter will include simulation benchmarking to establish a common setup for simulations. It will also include common numbers and locations for design goal dose rates at beam dump and along the beam line, and dose and activation values at specific locations of hall equipment, e.g., the SHMS magnets. For Wide-Angle Compton Scattering (WACS) processes, discussions identified important items for a cohesive approach in both scientific focus and experiment design. Optimizations of the science output for the  $K_L$  facility were discussed including improvement of the resolution, unpolarized deuterium running, including the anticipated data in Partial Wave Analysis. The path forward for new opportunities with an optimized photon source and calorimetry will also consider experiments beyond WACS. A mini-proceedings and a short white paper documenting the photon source concept and scientific benefits to hadron structure and spectroscopy studies, and summarizing the talks presented at the workshop is being prepared.

## 5 List of Participants of HIPS2017 Workshop

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