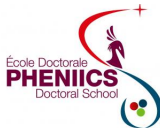


# The partonic structure of the nucleon

*Juan Sebastian Alvarado*  
*IJCLab - Orsay*

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université  
PARIS-SACLAY



# About me

- ❑ **Juan Sebastian Alvarado**
- ❑ Second year PhD student at Université Paris-Saclay.
- ❑ Funded by the PHENIICS doctoral school.

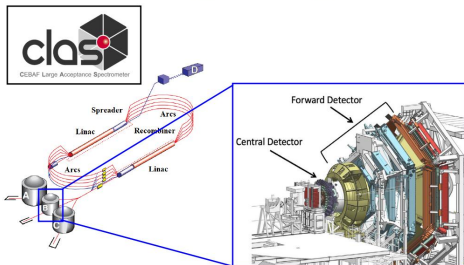


- ❑ Part of the Jefferson Lab group at IJCLab.
- ❑ Thesis devoted to nucleon-structure studies: data analysis and phenomenology.

# Jefferson Lab and CLAS Collaboration

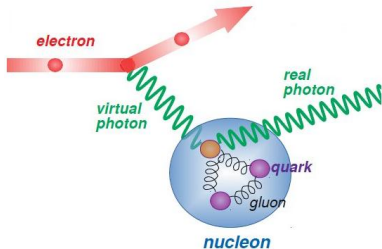


- ❑ Located in the state of Virginia at Newport News (US).
- ❑ Home of the Continuous Electron Beam Accelerator Facility (CEBAF).
- ❑ Electrons are accelerated and then sent to four different experimental Halls (A, B, C and D).
- ❑ Hall B contains the CLAS12 spectrometer, cornerstone of the CLAS Collaboration.



# Thesis subject

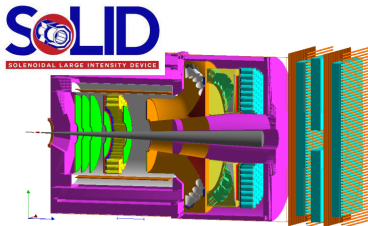
- ❑ In 2018, the electron beam was sent onto a liquid hydrogen target placed inside CLAS12.
  - ❑ One of the goals was to measure the Deeply Virtual Compton Scattering (DVCS) process.
  - ❑ From the information on the outgoing particles, we can obtain information about the internal structure of the nucleon through Generalized Parton Distributions.



- ❑ Today, I analyze this dataset using Machine Learning techniques.
  - ❑ The goal is to maximize the information we can obtain and create a useful method for current and future experiments.

## Role at JLab

- I took part in the data taking process by taking worker shifts.
- Soon I will be able to take expert shifts.



- I have worked with another collaboration.
  - Detector simulation.
  - Event generator implementation.

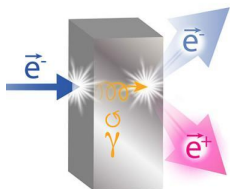
All thanks to the support of PROBES

# Role at JLab

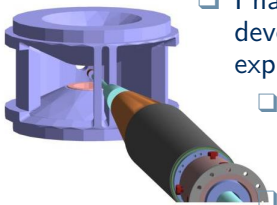
- I have shown my work in events.



- Poster and talks.



Polarized positron generation



Transverse target potential design

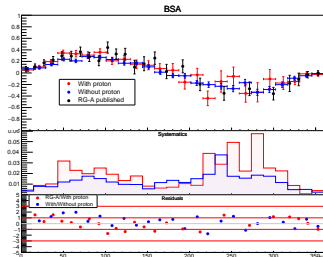
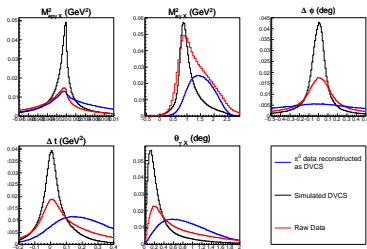
- I have participated in the development of future experiments at JLab.
  - Feasibility of a transversely polarized target experiment.
  - Double DVCS measurements using a positron beam.

All thanks to the support of PROBES

# Role at JLab

Data analysis work:

- ❑ I have a dataset made of two different components
- ❑ My work is to separate the components:
  - ❑ In the most efficient way.
  - ❑ With the least information possible.



- ❑ On the extracted component, we obtain more data for smoother behavior.
- ❑ All thanks to the support of PROBES.

## Summary

In summary, Jefferson Lab plays the most important role of my thesis as it:

- Provides the data.
- Allows me to connect with other experts.
- Helps me create a network with people who might be interested in my work and capabilities.
- Lets me better understand the development of an experiment by participating in it.

All of this was possible thanks to the support of PROBES.



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Thanks

Thanks