



DISSERTATION DEFENSE

Josh Yoskowitz

"Ion Production and Mitigation in DC High-Voltage Photo-guns"

2:00 PM

Friday, April 1, 2022

Location: CAS Seminar Room

Abstract:

One of the biggest obstacles to operating a GaAs polarized electron source with a long charge lifetime is the mitigation of ion back-bombardment. Several techniques exist to either clear ions from the accelerator or to mitigate ion damage of the photocathode. Predicting the effectiveness of these techniques requires sophisticated simulation models of electron impact ionization within the photo-gun. In this work, the effectiveness of applying a positive anode bias voltage to mitigate ion damage and increase the lifetime of the GaAs photocathode was studied over three run periods at the Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Lab (JLab). The charge lifetime with the biased anode configuration was 1.5-2 times greater than the lifetime of the usual grounded anode configuration. Simulations of ionization within the CEBAF photo-gun and adjacent beamline were made using General Particle Tracer (GPT) and a new C++ custom element to predict and explain the substantial improvement in charge lifetime. The development of the ionization custom element and its use in simulations of ion back-bombardment with the biased anode are described in detail.

See zoom information below

Josh Yoskowitz
April 1, 2022
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Zoom Info:

Join Zoom Meeting

<https://odu.zoom.us/j/96047133801?pwd=SmVUeDlacTVWYkdFR1JXR1B3b2xFQT09>

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213.19.144.110 (Amsterdam Netherlands)

213.244.140.110 (Germany)

103.122.166.55 (Australia Sydney)

103.122.167.55 (Australia Melbourne)

149.137.40.110 (Singapore)

64.211.144.160 (Brazil)

149.137.68.253 (Mexico)

69.174.57.160 (Canada Toronto)

65.39.152.160 (Canada Vancouver)

207.226.132.110 (Japan Tokyo)

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All interested persons are cordially invited to attend.