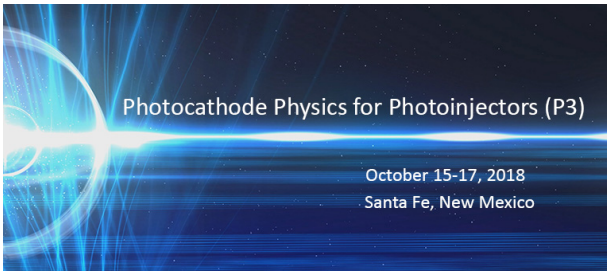

Contribution ID: **51** Type: **not specified**

Jlab magnetized gun

Tuesday 16 October 2018 16:45 (20 minutes)

Bunched-beam electron cooling is a key feature of all proposed designs of the future electron-ion collider, and a requirement for achieving the specified collision luminosity. For the Jefferson Lab Electron Ion Collider (JLEIC), fast cooling of ion beams will be accomplished via so-called 'magnetized cooling' implemented using a recirculator ring that employs an energy recovery linac. In this presentation, we describe the production of magnetized electron beam using a compact 300 kV DC high voltage photogun with an inverted insulator geometry and alkali-antimonide photocathodes. Beam magnetization was assessed using a modest diagnostic beamline that includes YAG view screens for measuring the rotation angle of the electron beamlet passing through a narrow upstream slit. Magnetization characterization including drift emittance were measured for various gun bias voltages and laser spot sizes at the photocathode using 532 nm lasers with DC and RF time structure. With magnetized beam, photocathode lifetime at currents up to 28 mA CW was measured and high bunch charge up to 0.7 nC was demonstrated.

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Session Classification: Session 8

Track Classification: Session 8: Operations and Demonstrations - Superconducting & DC