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**Generation and Characterization of Magnetized
Bunched Electron Beam from a DC High Voltage Photogun¹**

RIAD SULEIMAN, MATTHEW POELKER, JAY BENESCH, FAY HANNON, CARLOS HERNANDEZ-GARCIA, YAN WANG, Jefferson Laboratory — To maintain ion beam emittance and extend luminosity lifetime, the Jefferson Lab design of the Electron Ion Collider includes a bunched magnetized electron beam cooler as part of the Collider Ring. We are building a prototype magnetized gun using our newly commissioned 325 kV inverted-insulator DC high voltage photogun. This contribution describes planned measurements of beam magnetization as a function of bunch charge and average current, and laser beam size and magnetic field strength at the photocathode. Results will be compared to particle tracking code simulations. Photocathode lifetime at milliampere current will be compared to beam lifetime with no magnetization, to explore the impact of the magnetic field on photogun operation. Combined, these measurements and simulations will benchmark our design tools and provide insights on ways to optimize the electron cooler.

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- Prefer Oral Session
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