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Phase space measurements of an electron beam using the ASU cryocooled 200 kV DC electron gun

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The cryocooled DC electron gun at Arizona State University (ASU) is the first electron gun built to implement single-crystal, ordered surface and epitaxially grown photocathodes to produce cold and dense electron beams at the source. These high brightness electron sources are extremely desirable for ultrafast electron applications such as X-ray Free Electron Lasers (XFELs), Ultrafast Electron Diffraction/Microscopy (UED/UEM), and electron-ion colliders. Electron beams are produced from a cryogenically cooled photocathode using a tunable wavelength LASER to emit electrons close to the photoemission threshold. The full four-dimensional transverse phase space of the electron beam can be measured by a single pinhole scan technique, allowing us to directly calculate the transverse emittance in both dimensions. In this contribution we report and discuss the beamline setup and first measurement results.

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Footnotes

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Primary authors: GEVORKYAN, Gevork (Arizona State University); SARABIA CARDENAS, Carlos (Arizona State University)

Co-authors: BHATTACHARYYA, Priyadarshini (Arizona State University); KARKARE, Siddharth (Arizona State University); MOEINI RIZI, Mansoure (Arizona State University)

Presenter: GEVORKYAN, Gevork (Arizona State University)

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