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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 Xray 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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