Abstract Submitted
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Characterization of the source size and transverse emittance of a laser wakefield accelerated electron beam by means of inverse-Compton-scattering cross-correlation N. POWERS, S. CHEN, I. GHEBREGZIABHER, C. MAHARJAN[1], C. LIU, G. GOLOVIN, S. BANERJEE, J. ZHANG, University of Nebraska-Lincoln, N. CUNNINGHAM, Nebraska Wesleyan University, A. MOORTI[2], University of Nebraska-Lincoln, S. CLARKE, S. POZZI, University of Michigan-Ann Arbor, D. UMSTADTER, University of Nebraska-Lincoln — A recent focus in the development of laser wakefield electron accelerators (LWFA) has been the control of electron injection by ionization of inner shell electrons directly inside the accelerating structure [1]. Since electrons that are injected near the threshold of ionization are injected on axis, the resulting electron beams are expected to have lower divergence, as has been observed experimentally [2-5]; and thus they should also have lower transverse emittance. We used a technique based on inverse-Compton-scattering cross-correlation to measure the source size and normalized transverse emittance of an ionization-injected, laser-wakefield-accelerated electron beam. This is to our knowledge the first time a LWFA electron beam has been characterized by this means.

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