

Abstract Submitted
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**A Phase Space Study of an Electron Beam Interacting with Lasers
and Plasma Waves** A. BOWMAN, R. WILLIAMS, Florida A&M University —

The phase-space dynamics of the electrons in a beam that is intended to be used as a diagnostic of plasma waves has been studied theoretically, numerically, and experimentally. Previous numerical models predicted that the emittance of the electron beam passing through the plasma wave should be less than about 1 mm-mrad in order for the scattered electrons to retain information on the amplitude of the plasma wave after they exit the wave. In updates to the model, the interactions of the electrons with the CO₂ laser beam that excites the plasma wave and the YAG laser beam that diagnoses the plasma wave, have been added. Also discussed will be the results of attempting to control the beam emittance by varying the power to the thermionic emitter in the electron gun. The techniques for measuring the emittance will be discussed.

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