

Abstract Submitted
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Electron Beam Studies and X-ray Spectroscopy of Dense Plasma Focus Experiments.¹ EMIL PETKOV, STUART JACKSON, ANDREY BERESNYAK, NICHOLAS OUART, ARATI DASGUPTA, JOHN GIULIANI, United States Naval Research Laboratory, NAVAL RESEARCH LABORATORY TEAM — The study of electron beam generation in a dense plasma focus (DPF) can yield insight into the physical mechanisms that lead to the formation of electron beams in pinched plasmas. A detailed understanding of these mechanisms may enable the production of a high-intensity x-ray source for various applications. We plan to use plasma polarization spectroscopy (PPS) to measure the degree of polarization of several x-ray spectral lines emitted by a DPF driven by NRL's Hawk pulsed-power generator. Initial experiments will focus on diagnosing the plasma electron temperature in DPF experiments doped with Ar gas. This data will be used to validate a finite volume MHD code that calculated the plasma temperature and density of a Hawk shot doped with Ar gas. To measure the degree of polarization experimentally, two spectrometers will be configured with identical crystals that yield a Bragg angle as close to 45° as possible. The measured polarization will be compared with atomic and radiation calculations in order to determine the beam energy and infer the strength of the accelerating fields in the DPF. The development of a magnetic sublevel kinetics code, which will complement future spectropolarimetry studies, is also discussed.

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