Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Stark Broadening Analysis Using Optical Spectroscopy of the Dense Plasma Focus PATRICK ROSS, NIKKI BENNETT, ERIC DUTRA, E. CHRIS HAGEN, National Security Technologies, SCOTT HSU, LANL, GENE HUNT, JEFF KOCH, TOM WALTMAN, National Security Technologies, NSTEC DPF TEAM — To aid in validating numerical modeling of MA-class dense plasma focus (DPF) devices, spectroscopic measurements of the Gemini Dense Plasma Focus (DPF) were performed using deuterium and deuterium/dopant (argon/krypton) gas. The spectroscopic measurements were made using a fiber-coupled spectrometer and streak camera. Stark line-broadening analysis was applied to the deuterium beta emission (486 nm) in the region near the breakdown of the plasma and during the run-down and run-in phases of the plasma evolution. Densities in the range of 1e17 to low 1e18 cm^{-3} were obtained. These values are in agreement with models of the DPF performed using the LSP code. The spectra also show a rise and fall with time, indicative of the plasma sheath passing by the view port. Impurity features were also identified in the spectra which grew in intensity as the gas inside the DPF was discharged repeatedly without cycling. Implications of this impurity increase for D-T discharges (without fresh gas fills between every discharge) will be discussed. This work was done by National Security Technologies, LLC, under Contract No. DE-AC52-06NA25946, and by Los Alamos National Laboratory, under Contract no. DE-AC52-06NA25396 with the U.S. Department of Energy. DOE/NV/25946– 2515

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Date submitted: 22 Jul 2015 Electronic form version 1.4