Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Temporal evolution of electron density in anomalously dense non-equilibrium argon plasma TAEMIN YONG, MARK CAPPELLI, Stanford Univ — This study investigates generating a dense non-equilibrium plasma states in high presure (up to 10 bar) Argon. Initially, electric discharges are generated using high voltage nanosecond pulses (10 kV, 20ns) and then a relatively low energy picosecond laser (˜1 mJ) is applied for the further ionization of the initial dischage plasma. The electrode configuration consists of a pin-to-pin geometry with short gap (˜200 um). The temporal evolution of electron density during one cycle (˜100 ns) is measured by optical emission spectroscopy with 10 picosecond-resolution streak camera. The electron density is inferred from the Stark broadening of H line (656.2nm) and Ar I (2p-1s) line (696.5 nm).

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Date submitted: 15 Jun 2018 Electronic form version 1.4