Temporal evolution of electron density in anomalously dense non-equilibrium argon plasma

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— This study investigates generating a dense non-equilibrium plasma states in high pressure (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 discharge 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 (656.2 nm) and Ar I (2p-1s) line (696.5 nm).