Abstract Submitted
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Dense, cold, nonequilibrium plasma states in nanosecond-scale pulsed laser microdischarges[1] TAEMIN YONG, MARK CAPPELLI, Stanford university — We describe studies of the generation of dense non-equilibrium plasma states in atmospheric pressure. Discharge plasmas are produced using a Nd:YAG laser (15 ns, 15 mJ, 532 nm) followed by second-stage electron heating using a relatively low energy picosecond laser (20 ps, 1.2 mJ, 532 nm). A third, continuous-wave HeNe laser (10 mW, 632.8 nm), is used to record time-resolved (but spatially averaged) inverse Bremsstrahlung absorption from which electron number density is inferred. The analysis of the data relies weakly on estimates of electron temperature obtained from the continuous background emission in the visible range of the spectrum. Comparisons are made to electron density inferred from Stark broadening the OI 777 nm line. We find that second-stage picosecond laser heating elevates the average electron density by approximately 20 %, and present a model to understand the underlying kinetics.

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Taemin Yong
Stanford university

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