Abstract Submitted
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Towards Recombination Pumped H-Like N X-Ray Laser[1] I. GISSIS, A. LIFSHITZ, A. RIKANATI, I. BE'ERY, U. AVNI, A. FISHER, E. BEHAR, Technion, Israel — The recombination pumping scheme for soft X-Ray lasers has better energy scaling, than the collisional-excitation pumping scheme. Implementation of an H-like $3 \rightarrow 2$ Nitrogen recombination laser, at $\lambda \sim$13.4 nm requires initial conditions of 50% fully stripped Nitrogen, kTe$\sim$140eV and $n_e \sim 10^{20} cm^{-3}$. The cooling period to below 60eV should be faster than the typical three-body recombination time in order to reach population inversion. Our study aims at achieving the required plasma conditions using a capillary discharge Z-Pinch apparatus. The experimental setup includes capillaries in different radii, coupled to a pulsed power generator of $\sim$60 kA peak current, with a quarter-period of 60 ns. Various diagnostic techniques were applied to measure the plasma conditions, including X-Ray diodes and time-resolved pinhole imaging. Here we introduce time resolved spectroscopic measurements analysed with a multi-ion collisional-radiative model, from which we derive the plasma temperature temporal evolution. The analysis shows a rapid cooling period to below 60eV, demonstrating the feasibility of recombination-pumped capillary discharge lasers.

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