Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Towards Recombination Pumped H-Like N X-Ray Laser ITAY GISSIS, ASAF LIFSHITZ, NIR KAMPEL, AVI RIKANATI, ILAN BEERY, URI AVNI, AMIT BEN-KISH, AMNON FISHER, AMIRAM RON, Physics Department, Technion, Israel — The recombination pumping scheme for soft X-Ray lasers has better energy scaling, in comparison to the collisional pumping scheme. Implementation of an H-like $3 \rightarrow 2$ Nitrogen recombination laser, at $\lambda \sim$13.4 nm requires initial conditions of 50% fully stripped Nitrogen, Te$\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. Here we study the possibility to achieve the required plasma conditions using a capillary discharge Z-Pinch apparatus. The experimental setup includes a 90mm long ceramic capillary with an inner diameter of 5mm, coupled to a pulsed power generator supplying a peak current of $\sim$60 kA, with a quarter-period of 60 ns. We used various diagnostics techniques to measure the plasma dynamics including X-Ray diodes, time-integrated spectrometry and time-resolved pin-hole imaging (using a framing MCP camera). Analysis of the results shows a rapid cooling period to a temperature below 60eV, demonstrating the feasibility of recombination-pumped capillary discharge lasers.

Amnon Fisher
Physics Department, Technion, Israel

Date submitted: 10 Sep 2009 Electronic form version 1.4