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Nitrogen Recombination X-Ray Laser Scheme in a Capillary Discharge Z-Pinch I. BE'ERY, N. KAMPEL, A. RIKANATI, U. AVNI, A. BEN-KISH, A. FISHER, A. RON, Physics Department, Technion - Israel Institute of technology, Haifa 32000, Israel — A recombination based X-Ray laser has a preferred energy scaling compared to collisional ionization scheme [1-3]. The difficulty in realizing this scheme lies in the required plasma cooling rate [4,5]. Implementing a nitrogen recombination laser at λ ~13.4 nm, requires initially T_e ~140eV and N_e ~10^{20}cm^{-3}, and than cooling to T_e <60eV, at a time scale shorter than the 3-body recombination time scale of 3-6ns. An experimental setup has been built to achieve these conditions in a capillary discharge. A 90mm long capillary with 3-6mm inner diameter was filled with 0.5-3 Torr N_2 and coupled to a generator supplying a peak current of 60-70 KA at 70 ns. The radiation from N^{5+} and N^{6+} was measured with XRD and appropriate filters. The results show that the cooling time of the plasma is shorter than 5 ns, indicationg that the recombination scheme may be feasible. The experimental measurements will be used in search for the optimal initial conditions for lasing.

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