Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Laser emission at $\lambda = 337.1$ and $\lambda = 357.7$ nm of N_2 molecules in inductively coupled plasma ALEXANDER RAZHEV, DMITRY CHURKIN, Institute of Laser Physics SD RAS — Pulsed inductively coupled plasma for inversion population formation on electronic transitions of neutral atoms and molecules of gases was used. UV inductive N_2 laser at $\lambda = 337.1$ nm and $\lambda = 357.7$ nm has been created. The system for formation of the pulsed inductive discharge of the cylindrical form in gases was described. Results of an experimental investigations of spectral, temporal and energy parameters of spontaneous and laser radiation of the inductive N_2 laser operated in pure nitrogen and gas mixtures of N_2 with NF_3 and SF_6 are presented. The generation only at $\lambda = 337.1$ nm, corresponding to the (0 - 0) band of the second positive system of $C^3\Pi_u \rightarrow B^3\Pi_g$ transition of nitrogen molecules was obtained in pure nitrogen pumped by inductive discharge. The generation at $\lambda = 337.1$ nm and $\lambda = 357.7$ nm was obtained in gas mixtures of N_2 with NF_3 and SF_6. Under optimal conditions the behavior of $\lambda = 337.1$ nm to $\lambda = 357.7$ nm intensities was approximately as 10:1. Total mixture pressure was varied in a range 0.1 - 3 Torr. The maximal generation energy of 4.5 mJ at pulse duration (FWHM) 15 ± 1 ns was achieved. Laser beam had a ring shape with external diameter about 42 mm and the thickness of 1.0 - 1.5 mm. Inductive N_2 laser could operate with pulse repetition rate up to 50 Hz. The present work has been supported by RFBR, Grant # 06-02-16149-a.

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Date submitted: 17 Jun 2008 Electronic form version 1.4