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PULSED LASERS AND LASER APPLICATIONS

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ABSTRACTS

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of the average power and efficiency among all lasers on self terminating transitions was obtained, allows to expect to achieve practically significant results.

The studies were carried out in two different gas discharge tubes with an external heating element. The interelectrode distance was 30 and 15 cm, respectively. The diameter of the active medium in both cases was 5 mm. The pumping pulses were generated in the burst operation mode using an electric circuit with an eptron [1], capable of generating high voltage pulses with a leading edge duration of units of nanoseconds and a pulse repetition frequency of up to 200 kHz. The resulting duration of the lasing pulses was approximately ~ 20 ns. Comparison with the experimental results [2] obtained by the method of double pulses is carried out.

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1. *Bokhan P.A., Belskaya E.V., Gugin P.P., Lavrukhin M.A., Zakrevsky D.E., and Schweigert I.V.* Investigation of the characteristics and mechanism of subnanosecond switching of a new type of plasmas switches. II switching devices based on a combination of 'open' and capillary discharges—eptrons // *Plasma Sourc. Sci. Technol.* 2020. V. 29, No. 8. P. 84001.
2. *Markova S.V. and Petrash G.G.* Pulsed laser based on a resonance—metastable level transition in mercury ion // *Quant. Electron.* 1995. V. 25, No. 9. P. 841–845.

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FREQUENCY ENERGY CHARACTERISTICS OF A CuBr LASER UNDER BREAKDOWN CONDITIONS

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The active medium of pulsed periodic copper vapor lasers (CVL) is characterized by a high pre pulse electron concentration $n_{e0} \sim 10^{13} \text{ cm}^{-3}$. Therefore, it was assumed that the development of the discharge under these conditions occurs without a breakdown stage, and a simple oscillatory circuit is used as the equivalent circuit of the laser discharge circuit, which determined the approach to choosing the optimal pumping conditions. However, as studies have shown, the development of a discharge in gas discharge tubes (GDT) with electrodes located in cold buffer zones (CBZ) is carried out with a breakdown stage.

The report considers the processes of pumping the active medium and the formation of an inverse population, and also considers the reasons for the limitation of the frequency energy characteristics (FEC) of metal vapor lasers (Cu and CuBr) under breakdown conditions. Technical solutions are proposed to neutralize the processes that limit the FEC of laser radiation. The results of experimental studies are presented, confirming the effectiveness of the proposed technical solutions.

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PULSE PERIODICAL CO₂ LASER OPERATING AT PRESSURES UP TO 12 ATMOSPHERES

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Nanosecond pulses of radiation in the form of a single peak in the region of 10 microns are important for applications in such areas as laser location, environmental monitoring, testing of IR photodetectors. The generation of radiation pulses with a duration of less than 10 ns in CO₂ lasers is associated with an increase in the pressure of the working mixture to 10 Atm or more.