Optically pumped rare gas laser (OPRGL)

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Optical pumped rare gas Laser (OPRGL) on metastable atoms of inert gases is new promising optical generator in which high quantum efficiency is combined with good optical quality of the output beam. The optical medium of the laser consists of a mixture of rare gases containing a buffer gas (usually helium) and a gas on the atoms of which generation occurs - Ne, Ar, Kr or Xe. The content of generating gas in the mixture ranges from 1 to 5%. Since receiving the first generation on inert gas atoms (Kr) in 2012 [1], studies of the active medium [2,3] have been carried out aimed at optimizing laser parameters, such as increasing the generation output and the efficiency of using optical pumping.

This paper presents the results of experiments on the study of a laser on a mixture of inert gases with optical pumping (OPRGL). Dependence of generation power on repetition frequency of discharge pulses and on gas mixture flow rate for medium 2% Ar + 98% He is presented. The results of generation study experiments for 2% Ar + 98% Ne medium are presented.

Pulse-periodic discharge was used to create active medium. During the experiments, the following parameters were varied: pressure and flow rate of the gas medium, transmission coefficient of the mirrors of the optical resonator, repetition rate of electric discharge pulses. The maximum generation power obtained in the experiments was 4.5 watts. Some experiments were carried out with neon acted as a buffer gas for argon instead of helium.

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