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Abstracts

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This book contains the materials on the fundamental and applied problems of pulsed lasers. It may be interesting for researches and engineers working in the sphere of quantum electronics, spectroscopy, plasma physics, medicine, remote sensing and laser technologies.

Designed by *Kirill O. Osiev, osiev@inbox.ru*

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PARAMETERS OF REP DD'S PLASMA FORMED DURING THE PULSE AND PULSE-PERIODIC MODES IN THE DENSE GASES

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For the plasma formed during the pulse and pulse-periodic modes of runaway electrons preionized diffuse discharge (REP DD) in the argon at elevated pressure average values of an electron density were measured. Dynamics of electron concentration in the plasma of the pulse-periodic REP DD in the atmospheric argon was established. Average values of the an electron concentration in the plasma of pulse-periodic REP DD in the air and nitrogen of atmospheric pressure were $\sim 3 \cdot 10^{14}$ and $\sim 4 \cdot 10^{14} \text{ cm}^{-3}$, respectively. In addition, for the atmospheric plasma formed during the pulse-periodic mode in the air and nitrogen average values of an electron temperature and reduced electric field, as well their dynamics were determined.

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LUMINESCENCE OF ATOMS AND IONS OF METALS IN A PULSE-PERIODIC NANOSECOND DISCHARGE

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Spectral and amplitude-temporal characteristics of plasma radiation of the nanosecond pulse-periodic discharge in air, nitrogen and argon in pressure range of 30–760 Torr was investigated. Voltage pulses (amplitude is –13 kV, FWHM is 10 ns, rise-time is 4 ns) were applied to a pointed electrode made of different metal. It was found that near the cathode tip jets of different colour are formed due to explosive emission. It were registered intense lines of atoms and ions of ferrum in the wave length range of 200–600 nm, aluminum with $\lambda = 394.4, 396.15 \text{ nm}$, including multicharged ion Al VI with $\lambda = 360.39$ and 361.65 nm , copper with $\lambda = 324.8, 327.3, 510.6, 515.3, 521.8, 522 \text{ nm}$. The resonance energy transfer from metastable $A^3\Pi_u^+$ level of nitrogen to $3d^{10}4p$ level of Cu I was found. As a result a luminescence duration of Cu I with $\lambda = 522 \text{ nm}$ was about 2 ms at duration of discharge current of 1.5 μs . During contraction of the diffuse discharge the deposition of material occurs in the direction perpendicular to the axis of the discharge gap.

The work is performed in the framework of the Russian Science Foundation (the Project No. 14-29-00052).

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EXCILAMP'S APPLICATION IN AGRICULTURE AND ANIMAL BREEDING

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The animals of the stockbreeding complexes spent the entire life cycle indoors to prevent the spread of epidemic diseases and on the other hand, animals are deprived of access to sunlight, including the short-wavelength part of solar UV radiation (approximately 290–320 nm), that in natural conditions stimulates the physiological activity of animals via complex photochemical and physiological reactions. It was shown that excilamp radiation leads to good physiological statement