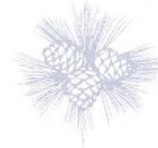
XII International Conference

September 14 – 18, Tomsk, Russia

AMPL 2015



atomic and molecular
pulsed lasers

CONFERENCE ABSTRACTS

The 12th International Conference

ATOMIC AND MOLECULAR PULSED LASERS

September 14–18, 2015
Tomsk, Russia

Abstracts

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2015

The 12th International Conference "Atomic and Molecular Pulsed Lasers": Abstracts. – Tomsk: Publishing House of IAO SB RAS, 2015. –138 p.

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.

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Abstracts were printed from the electronic forms presented by the authors.

ISBN 978-5-94458-153-2

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FILAMENTATION OF GIGA- AND TERAWATTS LASER PULSES IN THE WATER AND GLASS

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Presents the results of experiments investigating the spatial characteristics of the field of multiple filamentation giga and terawatt pulses of Ti : Sapphire laser in the glass and water. The dependences obtained are the coordinates of the filamentation region, number of filaments, their distribution along the axis of the laser beam, the length of the filaments from pulse power. It is shown that for both water and for glass the spatial characteristics of filamentation region are qualitatively similar appearance. Found that the number of filaments along a region of multiple filamentation has a unimodal distribution. With increasing radiation power, the length of the individual filaments in the field of multiple filamentation is reduced, and the diameter has a quasi-constant value for all values of power, realized in the experiments. The filamentation region, when reaching a certain power laser pulse having a Gaussian distribution of energy density, takes the form of a hollow cone, the apex directed to the source of radiation. Work was financially supported by the Russian Science Foundation (Agreement No. 15-17-10001).

C-18

MODELS OF FORMATION OF THE FIELD OF MULTIPLE FILAMENTATION IN GLASS AND WATER

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The results of natural experiments of the propagation of powerful femtosecond laser radiation in glass and water, accompanied by multiple filamentation, and the results of numerical simulation of the process are presented. The purpose of these experiments was to find regularities of multiple filaments along a propagation path. These experimental results are the basis for refinement and development of our theoretical models of multiple filamentation. The first comparison of the results of naturalexperiment with the results of numerical simulation indicates only the possibility of accordance. However, because of the ambiguity of the theoretical values of the parameters of nonlinearity of the medium, it is necessary to vary these parameters in order to approach the experimental results, and it is shown in this work. Thus, when numerical simulations of the process provide qualitative results, we propose a simple semi-empirical model of the process, which has a simple physical meaning and allows to reproduce the experimental results with enough precision at substantially lower expenses.