14th International Conference Laser Optics 2010

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This issue of *Optika i Spektroskopiya* (Optics and Spectroscopy) presents a part of papers that were reported at the 14th International Conference Laser Optics 2010, which was held in Saint Petersburg from June 28 through July 2, 2010. This conference gathered 690 participants from 39 countries, who presented 382 reports. Papers published in this issue give a clear idea about basic trends of the development of modern laser physics, photonics, and technology. Here, we will briefly characterize presented works.

The field of solid-state lasers and nonlinear frequency conversion continues to attract attention from researchers. The paper by A.S. Alexandrovsky et al. considers the modern approach to the frequency conversion based on the use of photonic crystals. Modern gas lasers are presented in this issue by the analysis of the yield of singlet oxygen upon optical pumping by fullerene that was done by O.B. Danilov and M.S. Yur'ev.

The four next papers discuss semiconductor lasers and devices based on them. Here, expanding applications of quantum-size structures in lasers demonstrate a stably growing tendency (two papers by M.M. Zverev with coauthors).

An impressive progress in the generation of super-strong laser fields betokens a breakthrough into a new area of physics in which the nonlinearity of the vacuum itself plays the key role and fundamentally new laser applications are possible. Three papers of this issue are devoted to the creation of an X-ray laser (the work by L.M. Lavrov et al.) and to an accelerator of ions by intense ultrashort laser pulses (two works of A.A. Andreev and K.Yu. Platonov).

Dynamically developing various directions of nanophotonics and biophotonics, the importance of which has already become evident, are reflected in nine papers of the corresponding section. Six papers present an experimental and a theoretical analysis of the interaction of laser radiation with nanomaterials,

including metal nanoparticles (the work by A.L. Stepanov) and nanowaveguides (the paper by O.N. Kozina et al.), as well as of a plasmon resonance in nanographite suspensions. Three other papers yield information on the use of lasers for diagnostics in ophthalmology (S.N. Sakhnov et al.) and for therapy of blood diseases, as well as on quantum-chemical calculations (H. Fueno et al.).

Various properties of laser optical materials are considered in three papers from the next section. One of them is devoted to the investigation of a promising laser on the basis of Nd:YAG-ceramics (J.K. Jabczynski et al.). Calculations of the lasing properties of a photonic crystal with active nanorods are performed in the work of O.N. Kozina and L.A. Mel'nikov. The paper by A.A. Pushkar' with coauthors studies the excitation of broadband luminescence in an active medium.

In two papers, two-mode fibers (R. Poozesh et al.) and directed couplers (V.S. Serebryakova and G.B. Deineka) are considered as applied to optical communication systems. The publication by I. Apostol et al. on the application of lasers to the analysis of artworks will definitely attract interest. Finally, the issue is decorated with the paper by E.M. Buyanovskaya and S.A. Kozlov, which, unfortunately, is the only one among all the papers reported at the conference within the framework of the program "Laser Optics for Young Scientists," although the attraction of young researchers to investigations into photonics is undoubtedly very important for the development of this challenging science.

Despite the forced fragmentariness of the representation of the conference on laser optics in this issue, we can hope that all the presented papers will find the interested reader.

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