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Introduction

This volume contains a selection of invited and contributed research papers presented at the International Workshop on Quantum Optics 2007 held 18–22 September, 2007, at the sanatorium “Forest Pearl” in the vicinities of Samara, a well-known educational, scientific, and cultural center of Russia. IWQO’07 was organized by Samara State University, the Samara Branch of the Lebedev Physical Institute of the Russian Academy of Sciences, and by the Zavoisky Physical-Technical Institute of the Kazan Scientific Center of the Russian Academy of Sciences. The main aim of this workshop was to discuss the modern art of investigations on the following broad topics: entangled states in optics, effects of quantum interference, problems of quantum memory, quantum imaging, polarization tomography of quantum states of light, femtosecond coherent spectroscopy, superradiance and photon echo, quantum teleportation, and actual problems of gamma-optics.

Now quantum optics is the important scientific direction of modern physics. The Einstein-Podolsky-Rosen paradox, teleportation, microlasers, vacuum fluctuations, quantum beats, coherent and squeezed states of light, entangled state of particles, field-field and photon-photon interferometry, photon antibunching, biphotons, quantum memory, laser cooling, superradiance and optical transient phenomena, and femtosecond coherent spectroscopy are the most important scientific problems of quantum optics. 136 papers were presented, including 30 invited papers. About 140 scientists from Russia, Belarus, the United States, and Germany presented their recent achievements at IWQO’07.

The IWQO’07 program included papers devoted to entangled states in optics, methods of protected coding of information in optical lines, quantum storage on subradiant states in an extended atomic ensemble, an electromagnetically induced transparency, cooperative superfluorescence in nanoclusters, quantum absorption of atoms on a surface, generalized poissonian photon distribution in a single nanoparticle fluorescence, interaction of ultrashort optical pulses with carbon nanotubes, experiments on ultrafast spectroscopy and femtosecond echo-spectroscopy, single molecule spectroscopy, and the various problems of gamma-optics.

The proceedings of IWQO’07 will be of interest to a broad spectrum of the international technical and scientific community since the area of quantum optics has prospective technical use.

Vitaly V. Samartsev

