

PROCEEDINGS OF SPIE

Photonic Materials, Devices, and Applications III

**Ali Serpengüzel
Gonçal Badenes
Giancarlo C. Righini**
Editors

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Introduction

Photons from a wide spectral range are continuing to influence our daily life. Today optical science and photonics engineering are developing at a faster pace than before. Beginning with the new millennium, countries are officially including optics and photonics in their research programs to cover application fields from automotive and home lighting to information and communications, from life sciences and health to displays, from remote sensing to nondestructive diagnostics, and from material processing to photovoltaics. More and more academic degree programs are being offered in optical sciences and photonics engineering, and soon there will be a new batch of optical scientists and photonics engineers roaming the planet. These are indeed very exciting times for all of us.

The scope of this conference on photonics materials, devices, and applications has been to bring together optical scientists and photonics engineers, who work on the different aspects of this fascinating science and technology in academia, industry, and government laboratories and research centers throughout the world. The aim has been to provide an interdisciplinary update and review of innovations in photonic materials, devices and applications, as well as theoretical, experimental, and numerical tools that support these innovations. This year's conference included topics such as photonic atoms, photonic crystals and glasses, metamaterials, nanophotonics, terahertz photonics, novel photonic materials, photonic devices, photonic applications, integrated photonics, silicon photonics, quantum structures, and quantum communication.

Ordered photonic atoms leading to photonic crystals, and disordered ones leading to photonic glasses, are in a class of their own. Metamaterials continue to fascinate us with their counterintuitive behavior. Silicon microphotonics is developing at a fast pace to integrate itself with silicon microelectronics. Integrated photonics is reaching down to the nanometer scale from the micrometer scale. Quantum communication is discussed in depth by focusing on noise, entanglement, and decoherence. Terahertz photonics imaging and communication open up a whole new spectral band. Quantum and nanophotonic structures are investigated for future application areas as well as for contribution to the fundamental science.

Although this volume includes only a fraction of the world's research and development efforts in the vast field of optical science and photonics engineering, we hope that these papers by world renowned experts pave the path for all of us towards future optical discoveries and photonics inventions. We would like to especially thank our conference sponsors, European Office of Aerospace R&D and Deutsche Forschungsgemeinschaft.

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