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Contents

QUANTUM OPTICS

SENSORS II

TELECOM AND NLO

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2 Integrated and Solid-State Optics
Misha Sumetsky, OFS Laboratories (United States)

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Rupamanjari Ghosh, Jawaharlal Nehru University (India)

4 PC I
Michelle L. Povinelli, The University of Southern California (United States)

5 Sensors I
Luc Thévenaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

6 Plasmonics and Metamaterials
Selim M. Shahriar, Northwestern University (United States)

7 PC II
Ortwin Hess, Imperial College London (United Kingdom)

8 Quantum Optics
Jacob B. Khurgin, Johns Hopkins University (United States)

9 Theory
Sean M. Spillane, Los Gatos Research, Inc. (United States)

10 Sensors II
Yunhui Zhu, Duke University (United States)
Daniel Joseph Gauthier, Duke University (United States)

11 Telecom and NLO
Robert W. Boyd, University of Ottawa (Canada)

Introduction

The field of slow light began in 1999 with the first demonstration of pulses propagating through an ultracold sodium gas with ultraslow group velocity. Since then, the field has blossomed, with many exciting advances occurring in a wide range of materials, including cold and room temperature gases, optical cavities, photonic crystals, metamaterials, semiconductor materials, and now even computer chips. Shortly after the demonstration of slow light in an ultracold gas, superluminal pulse propagation was demonstrated in a room temperature atomic vapor, and the field of fast light has evolved in parallel to the field of slow light. Now, through various techniques, systems can even be switched between normal and anomalous dispersion, allowing scientists the ability to switch between slow and fast light. The purpose of the 2013 Advances in Slow and Fast Light VI conference was to showcase the many exciting studies and practical applications of slow and fast light from research groups around the world. Talks were presented in several sessions with subjects that included resonators, integrated and solid-state optics, vapors, plasmonics and metamaterials, quantum optics, theory, telecommunications and nonlinear optics, as well as two sessions on photonic crystals, and two sessions on sensors.

The papers contained in the volume are meant to be representative of the work presented at this conference and demonstrate the current breadth of the field. Four quantum optics papers explore some of the more basic questions, such as quantum communication employing quantum storage, quantum tomography, the role of group velocity in the measurement of a quantum object's velocity, and propagation effects. On the more applied side, there are nine papers that come from the telecommunications/nonlinear optics and sensors sessions. These papers include work in tunable optical storage and cavity lifetime control, wideband optical switches and optics in photonics crystals, as well as sensor papers reporting advances in gyroscopes and the measurement of the Coriolis force. Finally, there are papers that fill in the intermediate range between fundamental and applied physics, including reports on slow light in photonic crystals and photonic crystal waveguides, microcells, whispering gallery mode and compact coupled resonators, vapors, microcells, and liquid crystals. All in all, there are twenty-five fascinating papers contained in this volume.

Neither the conference, nor the papers in this volume are intended to be representative of the wide range of work being done in the fields of slow and fast light, from fundamental studies to applied work. This volume is not exhaustive, but we hope the reader will find it useful.

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