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## ***Advances in Slow and Fast Light VII***

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**Frank A. Narducci**  
*Editors*

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# Introduction

Pulses propagating through ultracold sodium with ultraslow group velocity were first demonstrated in 1999, sparking a rapid growth in the study of slow light. Shortly thereafter, pulses propagating superluminally through a warm atomic gas were observed, igniting an equally active area of research in fast light. The fields of slow and fast light have witnessed many exciting advances occurring in the control of group velocity in a wide range of materials, including cold and room temperature gases, optical cavities, photonic crystals, meta-materials, semiconductor materials, and now computer chips. Techniques have now even been developed in these systems that allow switching between normal and anomalous dispersion experienced by a probe field, giving scientists the ability to switch between slow and fast light. The purpose of the 2014 Advances in Slow and Fast Light VII 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 single or multiple sessions on plasmonics and photonic crystals; sensors; quantum optics of slow and fast light; resonators and waveguides; as well as, sessions on data buffering and nonlinear optics; slow and fast lasers; slow and fast light with stimulated Brillouin scattering; general effects and applications related to slow and fast light; and a tutorial talk on slow and fast light in vapors.

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. This volume includes a paper on phase-sensitive systems; a contribution on slow light in metal-dielectric structures; two contributions from the quantum optics session on multimode quantum states and quantum entangled states; as well as, two contributions on effects in ring resonators and microresonators; and two contributions on Brillouin-based slow light in fibers and variable delay using Brillouin dynamic gratings. From the more applied sessions of sensors, data buffering and applications, there are papers on high-storage efficiency memory and buffering; gyroscopes; temperature sensing; slow light in liquid crystals; and optical cavity-enhanced fast light. All in all, there are sixteen papers contained in this volume.

Neither the conference nor the papers in this volume are intended to be a full representation of the wide range of fundamental and applied work being done in the field of slow and fast light. This volume is representative of works presented at the conference, and we hope the reader will find it useful.

**Selim M. Shahriar**  
**Frank A. Narducci**