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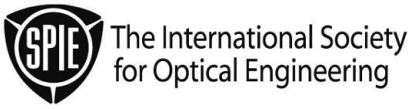

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Introduction

Global introduction of automated control systems into industry and the ever-increasing expansion of fundamental and applied scientific research horizons require various measuring devices that are suitable for real-time monitoring of physical fields, objects, and processes and are capable of being effectively integrated into sophisticated information and measuring systems (IMS). This dictates the need for new approaches to both the organization of the measurement process, and to devising of advanced high-speed IMS, as well as creating new technologies for the design and manufacture of measuring equipment having the ability to endow IMS with such fundamental properties as adaptivity, integration, self-verification, and self-correction capacities.

Modern measuring techniques and devices make wide use of optical, electric, magnetodynamic, piezoelectric, and other sensors. Recent progress in the fiber optic communication technology, both in Russia and abroad, gave birth to a fundamentally new metrology realm: fiber optic sensors (FOS). These sensors are highly advantageous when compared to conventional measuring techniques. The merits of these sensors include high sensitivity and operation speed; electromagnetic noise immunity; small size and weight; combination of measuring and communication function in a single element. There is also great potential of coupling with modern communication and computer systems to create essential prerequisites for the development of radically new distributed and branched multifunction information and measuring systems.

One of the most successful and promising application areas of fiber optic sensors is the measurement of deformation parameters where FOS have already enabled quite a few advanced and currently commercially available systems for structural health monitoring (SHM) of buildings, bridges, high-rise towers, ships, air- and spacecrafts. The rapid advancement of FOS in the field of structural health monitoring stems from the progress in a diversity of scientific areas concerned with opto and microelectronics. Among them the following are particularly worthy of note: investigations on new high-efficiency (including non-liner optical) schemes of fiber-guided light modulation by measured physical field parameters, researches on new methods of optical signal processing, exploration of novel micro- and nano-electronic structures for optoelectronics, development of new types of optical fiber sensors and further extending their application potential. The most recent results in the above mentioned fields have become the central focus of attention at the APCOM 2006 conference.

We would like to express our sincere gratitude to the organizers and sponsors of the conference as well as to all the participants.

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