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Editorial: Advanced photonic devices and sensing systems

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Editorial on the Research Topic
Advanced photonic devices and sensing systems

Nowadays, photonic devices have become an integral part of our daily life due to their excellent features of low cost, immunity to electromagnetic interference, rapid response, precise manufacturing methods, and improved security competencies. Their demand as a sensing probe is increasing more specifically in pharmaceutical, clinical, military, and industrial applications. The primary goal of this Research Topic is to introduce society to new methods, materials, and sensing techniques to achieve the goal of a healthy world and the requirements for a smart city.

This Research Topic on "*Advanced Photonic Devices and Sensing Systems*" comprised of articles from Frontiers in Photonics and Frontiers in Physics related to optical fiber and photonic devices for various applications, and it was organized by Associate Editors, Dr. Akhilesh Kumar Pathak (Northwestern University, United States), Dr. Rahul Kumar Gangwar (University of Delhi), Dr. Sushank Chaudhary (Chulalongkorn University, Thailand), Dr. Sneha Kumari (Indian Institute of Sciences, Bangalore, India), and Dr. Santosh Kumar (Liaocheng University, China). The goal is to highlight the advancement of photonics devices in various applications such as sensing, medicine, the power industry, energy, fast optics, and telecoms. The Research Topic comprises original research covering the fundamental applications. Four invited feature papers were accepted for publication in this Research Topic. The authors are from several universities, government labs, and industries.

The managing editor, Dr. Akhilesh Kumar Pathak, and guest editors thank the authors who submitted their papers to this Research Topic, the anonymous reviewers whose feedback ensures the high quality of the Journal, and the Frontiers publication team, for helping this Research Topic be a success. All the Guest Editors hope that this Research Topic can provide an in-depth look at this hot Research Topic and that future students, researchers, engineers, and industrial applicators can use this Research Topic as a valuable reference for photonics device and their applications.

All the published articles are listed below:

Summary: The Diffuse Speckle Pulsatile Flowmetry technique provides high monitoring rates of around 300 Hz for non-invasive measurement of blood flow in deep tissue,

exhibiting promising potential for the monitoring of various pathologies associated with abnormal blood flow. In this article, the authors examine the parameters that comprise this technique including speckle size and exposure time on measuring flow readings experimentally and report how the flow measurement sensitivity was affected by these parameters (Choo et al.).

Summary: In this article, the authors propose the designing of a dual-wavelength 2D fiber Bragg grating (FBG) written on a standard single-mode fiber to simultaneously monitor temperature and strain. The sensor showed a high sensitivity to a temperature and strain of 10.64 p.m./°C and 0.882731 p.m./uε at the central wavelength of 1548 nm, while the values were 10.74 p.m./°C and 0.916080 p.m./uε at the central wavelength of 1550 nm (Che et al.).

Summary: In this article, the authors design a new type of photonic crystal fiber (PCF) sensor coat with gold film for the simultaneous detection of voltage and magnetic fields. The sensing performance was investigated using FEM analysis. The sensor exhibited a high voltage sensitivity of 2.11 nm/V in the range of 5–35 V and a magnetic field sensitivity of 0.86 nm/Oe in the range of 90–210 Oe (Shi et al.).

Summary: The article reports the effect of launch beam distribution on space-division multiplexing performance in multimode multicore silica optical fibers (MM MC SOF) comprised of seven cores. The authors demonstrate that by increasing the capacity of an optical fiber transmission system, an SDM system with two- and three-channel ADM and multicore optical fiber multiplexing can be implemented with the proposed seven-core MM MC SOF at optical fiber lengths up to ≈1 km (2 ADM channels × 7 cores) and ≈200 m (3 ADM channels × 7 cores), respectively (Savović et al.).

Author contributions

All authors have contributed equally in the preparation of the editorial and the sucess of this special issue. All authors have read and agreed to the published version of the editorial.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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