Call for Papers

IEEE Photonics Journal

Special issue on Optical-fiber-based Integrated Sensing and Communication

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Scope and Topics

Benefiting from the capabilities of ultra-long-distance, high-speed data transmission, optical fiber communication networks have become the foundation of the information society since the successful development of low-loss optical fibers in the 1970s. Recent studies have revealed that the ubiquitous optical fiber infrastructure can also function as a highly sensitive distributed sensor, capable of detecting external physical perturbations such as acoustic waves, vibrations, temperature changes, and pressure variations along the fiber. By sharing transmitters, receivers, transmission links, and digital signal processing units, both communication and sensing functionalities can be achieved, giving rise to the promising field of optical-fiber-based integrated sensing and communication (O-ISAC). This integration of sensing and communication through shared hardware and software offers significant benefits in cost and efficiency. O-ISAC not only promotes the development of self-intelligent networks—enabling autonomous fault diagnosis through inherent sensing capabilities—but also provides a novel solution for large-scale sensing applications such as urban structural imaging, ocean seismic monitoring, and underground pipeline surveillance.

However, O-ISAC still faces significant challenges in both research and practical application: the mutual interference between sensing and communication functions is not fully understood; scaling these systems over long distances requires novel schemes to simultaneously enhance their key performance metrics; and a clear framework to reduce their cost and complexity is still needed. Meanwhile, data-driven machine learning and AI techniques have emerged as a promising trend.

We are pleased to invite you to share your latest research progress in this Special Issue organized by *IEEE Photonics Journal*. In this Special Issue, original research articles and reviews are welcome. Research areas may include (but not limited to) the following:

- O-ISAC based on optical fiber interferometer
- O-ISAC based on the scattering in the fiber
- O-ISAC based on power profile envelope analysis
- O-ISAC based on polarization analysis of the communication data
- Advanced digital signal processing (DSP) algorithms for O-ISAC, incorporating machine learning and artificial intelligence
- Novel modulation and demodulation techniques for O-ISAC
- High-performance optoelectronic devices and optical fibers tailored for O-ISAC
- Performance analysis and optimization of O-ISAC systems
- Instrumentation development for O-ISAC
- O-ISAC applications: results reporting and analysis

- Other related works

We hope all these efforts can accelerate the development and application of the O-ISAC and look forward to receiving your contributions.

Submission Guidelines
Submissions will be reviewed in accordance with the normal procedures of the Journal and papers must be formatted according to the Information for Authors found at:
https://ieeephotonics.org/publications/photonics-journal/

- Select the paper type "**Special Issue on Optical-fiber-based Integrated Sensing and Communication."**
- Select technical topic "**06 – Focus Issue**."

Important Dates
Open for Submissions: November 1, 2025
Submission Deadline: February 15, 2026
Tentative Publication: Summer, 2026
EARLY ACCESS: *DOI-citable articles will be published online after acceptance upon submission of final files and rights selection – sometimes well in advance of issue publication*.

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