

Special Issue

Advances in Short-Reach Optical Interconnects and Networking Technologies

Message from the Guest Editors

Short-reach optical interconnects play a critical role in developing high-capacity, low-latency optical networks, including passive optical networks, data centers, and mobile access networks. These technologies are evolving to meet the growing need for bandwidth, energy efficiency, and scalability, driven by applications such as cloud computing, artificial intelligence, 5G/6G, and edge computing. In passive optical networks, data rates are transitioning from 50 Gbps to 200 Gbps per wavelength, requiring advanced modulation formats, cost-effective optical components, and efficient digital signal processing. In parallel, Ethernet-based interconnects in data centers are pushing toward 800 Gbps and 1.6 Tbps, promoting co-packaged optics, silicon photonics, and low-power DSP algorithms. Advances in mobile front-haul and mid-haul links support high throughput and low latency of next-generation radio access networks. Innovation is needed from physical-layer devices and packaging technologies to system design and network architecture. This Special Issue explores advances in short-reach optical interconnects and networking technologies.

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