Special Issue

Modern Semiconductor Lasers: From VCSELs to QCLs

Message from the Guest Editors

This Special Issue invites contributions on the latest breakthroughs in semiconductor laser technology, emphasizing advances in Vertical-Cavity Surface-Emitting Lasers (VCSELs) and Quantum Cascade Lasers (QCLs). VCSELs continue to evolve, with improvements in high-power emission, high-speed modulation, and thermal stability, broadening their applications in 3D sensing, optical communications, and LiDAR systems. Meanwhile, QCLs have emerged as leading sources across the mid-infrared and terahertz spectra, with recent work overcoming barriers in power efficiency and system integration, opening new possibilities in portable sensing, environmental detection, and biomedical imaging. This Issue also seeks studies on emerging areas such as nanoscale lasers, innovative resonator architectures, and hybrid photonic integration aimed at next-generation computing and sensing. We welcome original research and reviews that present fundamental insights and practical solutions toward high-performance, application-ready laser systems.

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