



A Focus Issue on “Low-Dimensional Optoelectronic Chips and Integrated Intelligent Sensing”

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The rapid advancement of optoelectronic photodetectors has profoundly reshaped modern society. Low-dimensional semiconductors have emerged as promising platforms for next-generation optoelectronic chips due to their reduced surface carrier density, van der Waals integrability, and other exotic physical properties. Moreover, the intrinsically tunable characteristics extend device functionality beyond conventional detection toward intelligent sensing. Such capabilities enable more efficient system-level architectures through in situ preprocessing and compression of redundant sensory information.

In recent years, remarkable progress in material growth, scalable manufacturing processes, and intelligent multidimensional sensing has driven significant advances in detection performance, array fabrication, and multifunctionality. Moreover, the intrinsic tunability of low-dimensional materials enables adaptation to complex environments while supporting compact and portable architectures. These capabilities facilitate all-weather biometric monitoring and hardware-level autonomous decision-making, advancing the development of next-generation intelligent sensing systems.

To promote academic exchange and technological innovation in this rapidly evolving field, *Journal of Semiconductors* launches this focus issue titled “Low-Dimensional Optoelectronic Chips and Integrated Intelligent Sensing”. The collection welcomes original research papers and comprehensive reviews focusing on recent advances in materials, device structures, integration technologies, and system applications of low-dimensional optoelectronic technologies, particularly in intelligent sensing, on-chip integration, biometric monitoring, and robotic perception.

We warmly invite researchers worldwide to contribute their latest work and insights, and to join us in exploring the key scientific challenges and emerging opportunities shaping the future of low-dimensional optoelectronic chips.

This collection focuses but not limited to the following topics:

1. Growth and interface research of low-dimensional semiconductor materials
2. Data-driven design of low-dimensional semiconductor materials
3. Regulation of photonic and electronic properties of low-dimensional semiconductors and device development
4. Advanced transfer technologies for wafer-scale low-dimensional materials
5. Intelligent sensing for multi-dimensional optical information
6. Intelligent broad-spectrum photodetection and on-chip systems
7. Intelligent sensing and autonomous decision-making for biometric signals
8. New principles and paradigms for photoelectric perception-computing

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Manuscript Submission:

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Submit your manuscripts directly to the listing guest editors via the e-mail addresses above or directly submit via the online submission address at <https://mc03.manuscriptcentral.com/jos-iop>.

Please notify us in advance of your intention to submit a review paper.

Key Timetable Dates:

Manuscript Submission Deadline: **June 15, 2026**

Manuscript Acceptance Date: **July 15, 2026**

Publication Date: **October 15, 2026**