



Call for Papers

Announcing an Issue of the IEEE

JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS on

Advanced Modulators and Integration beyond Traditional Platforms

Submission Deadline: January 31, 2024

Hard Copy Publication: July/August 2024

The *IEEE Journal of Selected Topics in Quantum Electronics* (JSTQE) invites manuscript submissions in the area of **Advanced Modulators and Integration beyond traditional platforms** such as bulk Si, InP, and regular LiNbO₃ wafer. Although commercial optical transceivers are almost exclusively based on these platforms, recent research demonstrated immense potentials of optical modulation techniques using other photonic materials and hybrid integration with traditional platforms. These new functional materials can induce stronger carrier dispersion effects, provide different electro-optic effects that Si and InP cannot do, or enable new electro-optic modulation structures through their unique fabrication processes. Compared with existing Si and InP modulators, such advanced modulators promise higher bandwidth, lower driving voltage, reduced energy consumption, and more sophisticated modulation schemes that can meet the stringent requirement of data centers, high-performance computing, artificial intelligence, quantum information processing, Lidars, to name just a few. This special issue will focus on the recent progress of advanced optical modulators and integration beyond bulk Si, InP and LiNbO₃, with special emphasis on materials integration, devices fabrication and characterization, to system-level performance evaluation and supply chain issues related to large-scale production. Topics include:

- Ferroelectric modulators (excluding traditional bulk wafer) such as thin film LiNbO₃, BTO, and STO on semiconductor wafers
- Ultra-compact plasmonic modulators demonstrating high E-O modulation bandwidth
- Optical modulators enabled by 2-D materials such as graphene and metal-transitional dichalcogenides
- Optical modulators using semiconductor materials with higher plasma dispersion effect such as transparent conductive oxides and InGaAsP
- High-performance (speed, efficiency, loss) modulators enabled by organic materials
- Phase change materials with the demonstration of nonvolatile, low energy, beyond MHz working cycles and promising retention
- Non-traditional phase modulation structures such as photonic crystal cavity, slow light, and epsilon-near-zero that are driven by new materials

The scope of the special issue also encompasses system and integration of the aforementioned advanced modulators with related topics such as:

- Complex modulation formats
- New light modulation paradigms
- Integration with drive circuitry
- Application in optical transceivers for next generation of high-speed circuits
- Supply chain demands and challenges for some relatively matured technology choices (e.g., on LiNbO_x) that could constrain large-scale production

The Primary Guest Editors for this issue are **Alan Wang**, Baylor University, USA and **Juerg Leuthold**, Swiss Federal Institute of Technology in Zürich, Switzerland. The Guest Editors are: **Haisheng Rong**, Intel Corp., USA; **Tingyi Gu**, University of Delaware, USA; **Anna Lena Giesecke**, University of Duisburg-Essen, Germany; **Xi Xiao**, National Information Optoelectronics Innovation Center, China; **Bruce Wessels**, Northwest University, USA.

JSTQE has already begun accepting submissions for this special issue. The deadline for submission of manuscripts is **January 31, 2024**. Hardcopy publication of the issue is scheduled for **July/August 2024**.

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For inquiries, please contact:

IEEE Photonics Society JSTQE Editorial Office – Alexandra Johnson (Email: johnson.a@ieee.org)

Paper submission via IEEE Author Portal: <https://ieee.atyponrex.com/journal/jstqe-pho>

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