PIER Photonics

Editorial

PIER Photonics — Focusing on the Frontiers and Hot Topics

Photonics is how we harness light to engage with the world. From the ancient quest to understand the stars to the modern marvel of fiber-optic networks that connect our planet, our ability to generate, manipulate, propagate, and detect light has defined epochs of scientific and technological progress. Light is inseparable from our ability to observe, to communicate, to measure, and to create. Inspired by fundamental physics, we have engineered materials and devices that extend our mastery over the electromagnetic spectrum to unprecedented levels.

Today, the field of photonics has expanded and accelerated, attracting a diverse and vibrant community of researchers. Innovations in nanofabrication, materials science, computational design, and artificial intelligence have yielded optical structures with extraordinary capabilities. Metasurfaces, topological photonics, integrated quantum photonics, and biophotonics are now at the forefront of scientific discovery and technological application. Photonics is no longer merely a tool for other disciplines — it is a foundational pillar enabling next-generation solutions in information technology, healthcare, sustainability, and beyond.

It was in recognition of this dynamic landscape that we first announced our intent to launch a new premier flagship journal for high-impact photonics research during the opening ceremony of PIERS 2025 in Chiba, Japan, in early November last year. Our commitment to the frontiers and hot topics of photonics, however, did not begin with this announcement. For the past five years, we have successfully organized a mini-plenary session on hot topics at every PIERS symposium, each drawing over a thousand registered participants. These sessions have brought together leading researchers from around the world to debate emerging trends and chart future directions, offering us a front-row seat to the rapid evolution of the field.

Building on this momentum, we introduce *PIER Photonics*, a new premier open-access journal from The Electromagnetics Academy. Our vision is to build a top-tier journal that defines paradigms and drives fields forward. *PIER Photonics* focuses on the frontiers and hot topics — the most vibrant and transformative areas where breakthroughs are not merely incremental but redefine what is possible. We have curated six such frontiers that represent the vanguard of the field:

1. **Fundamental Science** — We seek pioneering work on novel light-matter interactions, quantum and nonlinear phenomena, and transformative tools that push the boundaries of physical understanding. Papers that open new paradigms will find a natural home here.
2. **Materials and Nanostructures** — Our focus is on the engineering of metasurfaces, two-dimensional material platforms, and emerging photonic materials that enable unprecedented control of light at the nanoscale. We prioritize work that demonstrates new functionalities or records-setting performance, rather than routine characterization or incremental optimization.
3. **Integrated Photonic Systems** — We target cutting-edge advances in integrated photonic platforms — including but not limited to silicon photonics — and hybrid integration for chip-scale systems. Of particular interest are emerging applications such as hyperspectral imaging chips (on-chip spectrometers), LiDAR, and intelligent photonic processors — technologies that are poised to transform communications, computing, and sensing.
4. **Healthcare and Life Sciences** — We highlight breakthroughs in bio-imaging, biosensing, diagnostics, and therapeutics that harness light to address pressing challenges in human health. Work that demonstrates clear translational potential or enables new classes of medical devices will be given priority.
5. **Sustainability and Information Technology** — We showcase research on efficient light sources, photonic solutions for energy, and next-generation technologies for optical interconnects, computing, and displays. Contributions that offer scalable, energy-efficient, or environmentally impactful solutions are particularly welcome.
6. **Emerging Frontiers** — This track is dedicated to visionary work that does not fit neatly into the other categories but defines the next paradigms of photonics. We actively seek the unexpected — the ideas that challenge assumptions and open entirely new directions.

With this focused scope, we aim to bridge traditional divides between subfields, encouraging ideas to flow across fundamental science, materials engineering, life sciences, systems integration, and applications. We are committed to thoughtful, rigorous, and timely peer review, evaluating each submission in its proper context to provide a balanced and fair assessment of impact. Our selectivity is not a barrier but a promise — to our readers that every paper we publish stands at the forefront or addresses a hot topic of its field, and to our authors that their work will be seen alongside the very best in photonics.

Our ambition is anything but modest. We fully recognize that a journal's reputation is earned not through declarations, but through the sustained excellence of the work it publishes and the integrity of its engagement with authors and reviewers. With the unwavering support of The Electromagnetics Academy, the global PIERS community, and our fellow edi-

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Published by THE ELECTROMAGNETIC ACADEMY

tors and authors, we are confident that we are well on our way to achieving the goals we have set for ourselves.

As we scale up, we will need to expand our editorial team. We are seeking enthusiastic and innovative researchers from around the world, including early-career scientists, who bring fresh perspectives and a collaborative spirit to the global research community, to join us as additional associate editors. If you believe you can contribute and would enjoy the challenge, please do not hesitate to contact us. We would be delighted to hear from you.

We welcome you to contribute to a dedicated space for photonics' frontiers and hot topics.

The Editorial Team*
PIER Photonics

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