



## Call for Papers

Announcing an Issue of the IEEE

JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS on

# Photonics for Climate Change Mitigation and Adaptation

Submission Deadline: February 1, 2025

Hard Copy Publication: November/December 2025

The IEEE Journal of Selected Topics in Quantum Electronics (JSTQE) invites manuscript submissions in **Photonics for Climate Change Mitigation and Adaptation**. Climate change poses one of the most complex and far-reaching challenges for humankind this century. From increased temperatures and extreme heatwaves, to ocean acidification, desertification and increased water scarcity, the broad scope of climate-related impacts we face. Driven, as climate change is, by carbon emissions, significant research efforts have yielded fruitful progress in enabling new, low-carbon approaches to a broad range of energy, water and manufacturing technologies. The extraordinary and unprecedented scaleup in global photovoltaics deployment, for example, is making many ambitious clean energy targets potentially within reach. Beyond mitigation however, there is now increasing recognition that even with the most aggressive decarbonization goals, global temperatures will still rise, and weather patterns will become more extreme. **Adaptation** has thus emerged as an important guiding framework for developing capabilities that will allow peoples and economies to flourish, even as our planet warms.

Optics and photonics have a unique role to play in tackling both climate change mitigation as well as adaptation. Next-generation optical sensors are making precise measurements of atmospheric gases possible, even in ultra-compact form factors, a crucial capability for ubiquitous monitoring of carbon emissions. While conventional Silicon-based photovoltaics is a mature platform, there remains substantial opportunities for further improving efficiency of PV systems. From an optics perspective this includes novel techniques and material systems such as up-conversion and quantum dots, as well as through improved light trapping and thermal management. Beyond clean energy generation and emissions monitoring and reduction, concepts from optics also have an important role to play in adaptation. Recent advances in radiative cooling, driven by optical material control of both solar absorption and thermal emission, herald the possibility of making buildings and the broader environment more resilient in the face of extreme heat. More broadly, controlling infrared thermal emission remains a comparatively underexplored strategy for better controlling the important radiative flows of heat that surround both buildings and humans every day. The *IEEE Journal of Selected Topics in Quantum Electronics* invites manuscript submissions that together capture a broad range of contemporary research on advances in optics as they pertain to both **climate change mitigation** and **adaptation**. Areas of interest include (but are not limited to):

- **Optics for solar energy**
- **Photovoltaic thermal management**
- **Solar fuels**
- **Radiative cooling and thermoregulation of buildings and the environment**
- **Thermophotovoltaics**
- **Thermal photonics for water-energy nexus**
- **Photonic sensing for climate change research**
- **Light-emitting diodes**
- **Dynamic optical materials**

The Primary Guest Editor for this issue is **Prof. Aaswath P. Raman**, University of California, Los Angeles, USA. The Guest Editors are: **Prof. Susanna Thon**, Johns Hopkins University, USA; **Prof. Jyotirmoy Mandal**, Princeton University, USA; **Prof. Baohua Jia**, RMIT University, Australia.

JSTQE will begin accepting submissions for this special issue on **August 1, 2024**. The deadline for submission of manuscripts is **February 1, 2025**. Hardcopy publication of the issue is scheduled for **November/December 2025**.

Unedited preprints of accepted manuscripts are normally posted online on IEEE Xplore within 1 week of the final files being uploaded by the author(s). Posted preprints have digital object identifiers (DOIs) assigned to them and are fully citable. Once available, the preprints are replaced by final copy-edited and XML-tagged versions of manuscripts on IEEE Xplore. This usually occurs well before the hardcopy publication date. These

final versions have article numbers assigned to them to accelerate the online publication; the same article numbers are used for the print versions of JSTQE.

**For inquiries, please contact:**

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

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