SPIE. PHOTONICS WEST OPTO

25 - 30 January 2025
The Moscone Center
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CALL FOR PAPERS

Submit abstracts by
17 July 2024

High Contrast Metastructures XIV (OE303)

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A completely new class of planar optics has emerged using subwavelength metastructures and metasurfaces with a large contrast in dielectric constants. “High-contrast metastructure” refers to this type of optical material which is formed by a planar array of coupled-resonance structures, which are defined by high refractive index contrast boundaries that have dimensions comparable to the wavelength of interest. By manipulating the resonance of each individual structures with the collective periodic resonance, this metastructure allows very strong light-matter interaction within the thin planar material which provides a new platform to efficiently manipulate photons. Both 1D and 2D, uniform and chirped high-contrast gratings (HCGs), metastructures and metasurfaces are demonstrated to create mirrors, lenses, filters, polarizations, birefrigent elements, 3D display and many traditional bulk optical components. This has enabled simple fabrication of long-wavelength vertical-cavity surface-emitting lasers (VCSELs), dynamically tunable all-pass filters (APF) for fast optical beam steering, high-Q resonators with surface-normal and arbitrary angle output, enabling massive wafer-scale semiconductor lasers and optical filters. They are used to form hollow core waveguide for chip-scale ultra-low loss photonic delays. Vertical to in-plane waveguide coupler can be made with high efficiency for easy integration with Si-photonic circuits. Chirped HCGs are shown as excellent focusing reflectors and lenses with very high numerical apertures. Recently, active metasurface research has been pursued. Finally, simple but rigorous theoretical studies lead to intuitive device designs. The field has seen rapid advances in exciting experimental demonstrations and theoretical results as well as commercial flat-optics applications. Most recently, applications extended to near-to-eye displays in a variety of waveguide combiner architectures for Augmented Reality (AR) and Optical See-Through (OST) Mixed Reality (MR) Head Mounted Displays (HMDs). This conference aims to provide an international forum for presenting the latest results and reviewing technologies relevant to new physics and devices using high contrast subwavelength metastructures. Prospective authors are invited to submit original experimental and theoretical papers dealing with enabling technology for optoelectronic device integration either on Si, or III-V-based platforms.

Topics of particular interests include incorporation of high-contrast metastructures in the following:

- metalens and diffractive optical elements for AR/VR HMD and 3D sensing
- 3D display and hologram: design, fabrication and applications
- metasurface optical phase masks for phase and polarization control
- topological lasers and high-Q resonators
- VCSELs, tunable VCSELs and membrane lasers
- broadband mirrors, lenses, and focusing mirrors
- optomechanics: physics and devices
- filters, tunable filters, WDM multiplexer and de-multiplexers
- all-dielectric dissipation-less metamaterials
- zero-index metamaterials and anisotropic metamaterials
- bound states in the continuum
- photonic topological insulator
- response to both the electric and magnetic fields of light
- support of large optical chirality and anisotropy
- dispersion engineering
- spectral tailoring and management for solar photovoltaic and solar thermal applications
- slow light, fast light, and stop light devices
- optical switches and modulators
- metastructure waveguides
- nonlinear optics; coherent optical mixers
- optical amplifiers
- omni mirrors and spatial-mode filtering
- subwavelength plasmonics
- manipulation of polarization
- beam-steering devices
- novel fabrication techniques and materials
- Inverse design simulation modeling for metastructures/metasurfaces
- photonic crystal devices, guided mode and leaky mode resonances.

Present your research at SPIE Photonics West

Follow the instructions below to develop a successful abstract for submission to a conference and review policies for publication in the Proceedings of SPIE in the SPIE Digital Library. Submissions subject to chair approval.

Important dates

Abstracts due	17 July 2024
Registration opens	October 2024
Authors notified and program posts online	7 October 2024
Submission system opens for manuscripts and poster PDFs*	25 November 2024
Poster PDFs due for spie.org preview and publication	2 January 2025
Manuscripts due	8 January 2025
Advance upload deadline for oral presentation slides**	23 January 2025

*Contact author or speaker must register prior to uploading
**After this date slides must be uploaded onsite at Speaker Check-in

What you will need to submit

- Presentation title
- Author(s) information
- Speaker biography (1000-character max including spaces)
- Abstract for technical review (200-300 words; text only)
- Summary of abstract for display in the program (50-150 words; text only)
- Keywords used in search for your paper (optional)
- Check the individual conference call for papers for additional requirements (i.e., special abstract requirements or instructions for award competitions)

Note: Only original material should be submitted. Commercial papers, papers with no new research/development content, and papers with proprietary restrictions will not be accepted for presentation.

How to submit your abstract

- Visit the conference page: www.spie.org/oe303call
- Choose one conference that most closely matches the topics of your abstract. You may submit more than one abstract, but submit each abstract only once
- Click the title of the conference to view the full description and submit by clicking the "Submit an Abstract" button on that page
- Sign in to your SPIE account, or create an account if you do not already have one
- Follow the steps in the submission wizard until the submission process is completed
- If your submission is related to an application track below, indicate the appropriate track when prompted during the submission process

Application track

Listed below are the application tracks available for this meeting. Application tracks aggregate presentations and focus on emerging technical and societal needs that require a multidisciplinary approach.

- **AI/ML:** Papers that highlight the use of artificial intelligence, machine learning, and deep learning to create and implement intelligent systems across multiple sectors, technologies, and applications
- **Sustainability:** Papers that highlight the use of optics and photonics for renewable energy, natural resource management, sustainable manufacturing, and greenhouse gas mitigation in support of the UN Sustainable Development Goals
- **Brain function:** Papers that highlight the development of innovative optics and photonics technologies that increase our understanding of brain physiology and function
- **Translational research:** Papers that highlight the transition from bench to bedside using the latest photonics technologies, tools, and techniques for healthcare
- **3D printing:** Papers that highlight the innovative use of optics and photonics in multidisciplinary applications for multidimensional manufacturing
- **Photonic chips:** Papers that highlight advances in materials, design, fabrication, integration, testing and packaging of photonic components at the chip level

Submission agreement

All presenting authors, including keynote, invited, oral, and poster presenters, agree to the following conditions by submitting an abstract:

- Register and pay the conference registration fee
- Agree to receive email messaging for the conference series
- Oral presenters: recording and publication of your onsite presentation (slides synched with voice) for publication in the Proceedings of SPIE in the SPIE Digital Library
- Poster presenters: one person may not present more than two posters in a poster session; poster presenters may submit an optional poster PDF available for preview in the online program (web and app) and for publication in the Proceedings of SPIE in the SPIE Digital Library
- Submit a manuscript by the advertised due date for publication in the Proceedings of SPIE in the SPIE Digital Library
- Obtain funding for registration fees, travel, and accommodations
- Attend the meeting
- Present at the scheduled time

Review and program placement

- To ensure a high-quality conference, all submissions will be assessed by the conference chair/editor for technical merit and suitability of content
- Conference chairs/editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations
- Final placement in an oral or poster session is subject to chair discretion

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