

Manipulating over reflection, polarization and collection of light with metasurfaces

Thursday, November 7, 2024 3:45 PM (30 minutes)

Two-dimensional (2D) materials offer unique opportunities for photodetection, light emission, energy harvesting, and enhanced light-matter interactions. Even more interest brings the artificially engineered 2D micro- and nanostructures with on-demand properties paving the way towards a plethora of specific applications and devices including lensing, holography, imaging, polarimetry, biosensing, etc. The rapidly developing use of 2D nanostructures poses new challenges for their proper engineering and novel applications.

Here, we focus on plasmonic and dielectric metasurfaces, which are the periodic arrays of subwavelength scatterers. We study the properties of metasurfaces and their applications for (i) Brewster's angle shifting [1], (ii) surface waves routing [2], (iii) planar waveguide polarizer, (iv) anti-reflective coatings for solar cells, and (v) efficient light collection into optical fiber [3].

References

- [1] O. Yermakov, Physical Review A, 109(3), L031502 (2024).
- [2] O. Yermakov et al., Physical Review X, 11(3), 031038 (2021).
- [3] O. Yermakov et al., Applied Physics Reviews, 10(1), 011401 (2023).

Type of presence

Presence at Taras Shevchenko National University

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Session Classification: Advances in Metasurfaces and Plasmonic Nanostructures