3D meta-optics for sorting light by wavelength, polarization and angle of incidence

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35 words abstract: Structuring optical properties with a spatial resolution much smaller than the relevant wavelength of light leads to optical structures with non-intuitive optical response. I discuss our recent progress in designing and fabricating these structures.

Full abstract: Modern imaging systems can be enhanced in efficiency, compactness, and range of applications through introduction of multilayer nanopatterned structures for manipulation of light based on its fundamental properties. High transmission efficiency multispectral imaging is surprisingly elusive due to the use of absorptive or reflective filter arrays which discard most of the incident light. Further, most cameras in use today do not leverage the wealth of information in the polarization and spatial degrees of freedom. Metaoptical components can be tailored to respond to these varying electromagnetic properties, but have been mostly explored in single-layer, ultrathin geometries, which limits their capacity for multifunctional behavior. Here we show the design of several pixel-sized scattering structures which sort light efficiently based on its wavelength, polarization state, and spatial mode. The multispectral and polarimetry devices are further fabricated via two-photon lithography and experimentally validated in the mid-infrared.

References

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