Planar Au meta-surfaces as broadband radial polarizers

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Planar meta-surfaces consisting of gold nanostructures with specifically designed geometries are a promising approach for novel optical components that opened the field of flat optics.¹² The moulding of the phase of the light on the nanoscale can, for example, result in lensing effects without the requirement of an extended optical path length for the modulation. Another exiting direction is the modulation of the polarisation and of the spatial distribution of the light intensity to obtain functional optical components.³

In our study, we chose a rhombus shape as the basic component for the meta-surface structures and use a mathematical algorithm to compute their arrangement for obtaining the desired functionality. We demonstrate this approach by fabricating near-field broadband radial polarizers as depicted in Figure 1. The optical properties of such flower-like meta-surfaces are studied by Fourier-Transform infrared absorption, finite element method simulations, and two-photon hyperspectral imaging.

References
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