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标题: Quarter-Wave Plate Based on Dielectric-Enabled Extraordinary Resonant Transmission
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摘要: A compact quarter-wave plate (QWP) based on a doubly periodic subwavelength hole array lying over a dielectric slab is synthesized analytically under perfect electric conductor assumption and its validity is demonstrated numerically for real metals (aluminum and silver) at terahertz (THz) and near infrared. The form birefringence is achieved via the excitation of transverse-magnetic and transverse-electric extraordinary transmission resonances for the perpendicular and parallel polarization to the short in-plane period, respectively. To prove the generality of the approach, a prototype working at the near-infrared is designed and numerically optimized. By imposing a maximum phase deviation of +/- 10 degrees from the ideal QWP response and an axial ratio smaller than 3 dB, the bandwidth of the designs are 0.6% and 0.4% for the 0.23-lambda-thick THz and 0.33-lambda-thick near-infrared prototype, respectively. Given the simplicity of the design, it holds promise for compact narrowband microwaves-to-visible polarizing devices.
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