

Controlling Polarization Across Two Bands with Synchronized Control of Singularities

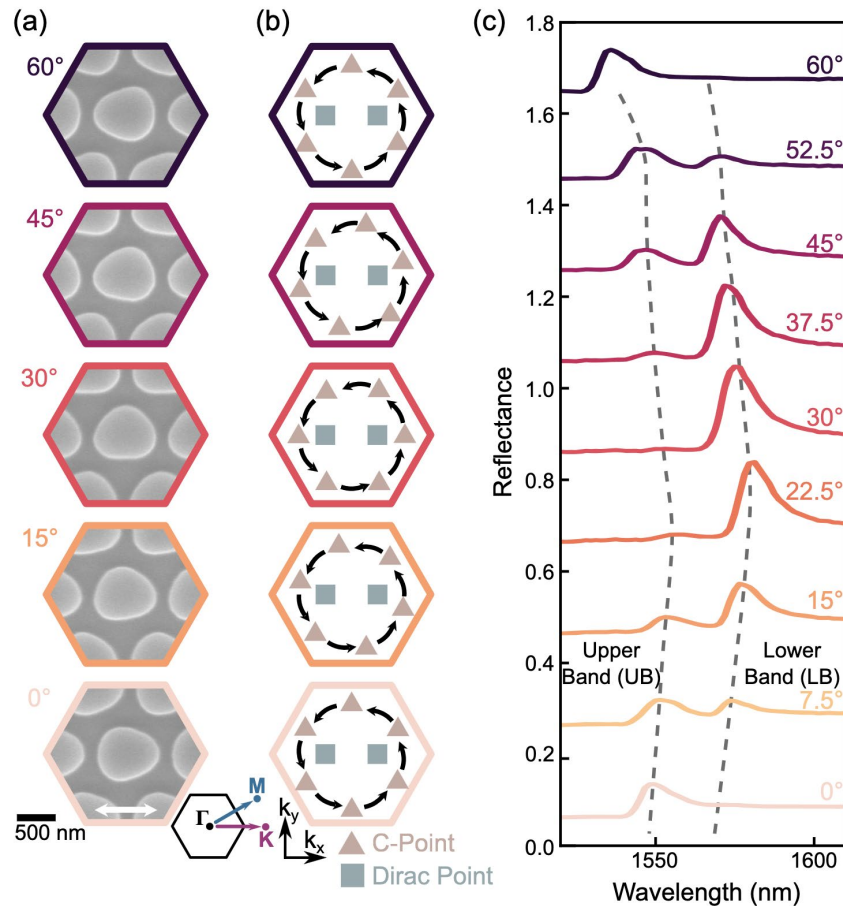


Figure: (a) Scanning electron micrographs of fabricated metasurfaces with C_3 deformation rotations. (b) Schematic depicting C-point rotations. (c) Measured reflectance spectra corresponding to rotation of C-points.

Scientific Achievement

Developed and experimentally demonstrated a new design paradigm for simultaneously controlling lifetime, splitting, and polarization singularities in two bands.

Significance and Impact

Expanding the capabilities of optical devices for sensing and quantum information sciences requires high quality-factors, polarization control, and robustness across multiple bands of interest. Beyond photonics, our approach can be directly applied to acoustic and opto-mechanical systems.

Research Details

- Used group theory for pairwise movement of polarization singularities.
- Experimentally demonstrated in silicon metasurfaces with mode splitting variances down to 1 nm while positioning polarization singularities.

Doiron, C. F.; Brener, I.; Cerjan, A. Dual-Band Polarization Control with Pairwise Positioning of Polarization Singularities in Metasurfaces. *Physical Review Letters*. 2024.

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