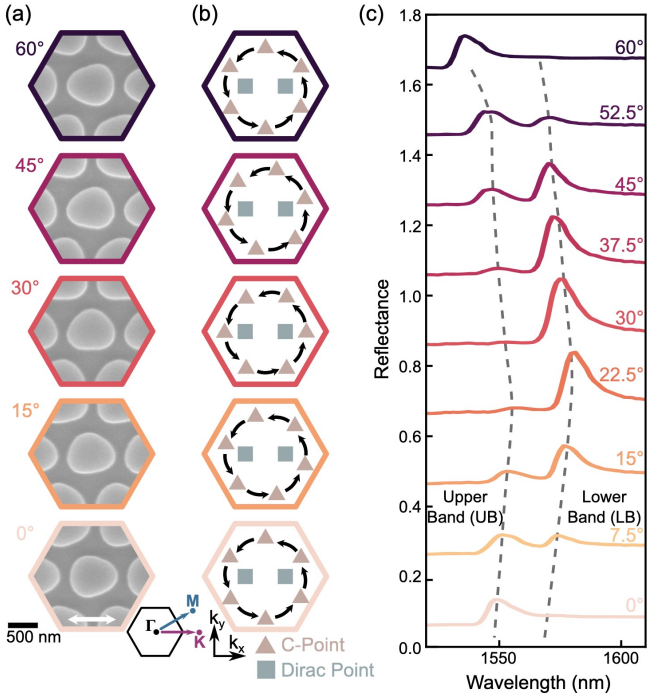
# Controlling Polarization across Two Bands with Synchronized Control of Singularities




**(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

Development and demonstration of 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

- Use of 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.

Work was performed, in part, at the Center of Integrated Nanotechnologies

Doiron, C. F.; Brener, I.; Cerjan, A. Dual-Band Polarization Control with Pairwise Positioning of Polarization Singularities in Metasurfaces. *Physical Review Letters* **2024**, *133* (21).