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Title: Topological control of light with graphene devices

Abstract: The topological structure associated with the branchpoint singularity around an exceptional point (EP) can provide tools for controlling the propagation of light. Using graphene-based devices, we demonstrate the emergence of EPs in the electrically controlled interaction of light with a collection of organic molecules in the terahertz regime at room temperature. We show that the intensity and phase of terahertz pulses can be controlled by a gate voltage which drives the device across the EP. Our electrically tuneable system allows reconstructing the Riemann surface associated with the complex energy landscape and provides a topological control of light by tuning the loss-imbalance and frequency detuning of interacting modes. Our approach provides a platform for developing topological optoelectronics and studying the manifestations of EP physics in light-matter interactions.

Reference: Ergoktas, M. Said, et al. Topological engineering of terahertz light using electrically tuneable exceptional point singularities. *Science* 376.6589 (2022): 184-188.