

# Excitations and Dynamics in Inversion Symmetry-Broken Phases

Emergent phenomena in solids, whether they involve lattice, charge, spin, orbital, or other degrees of freedom, are attractive for creating, stabilizing and/or controlling novel states in matter. New paradigms based on these phenomena are attractive candidates for capturing, converting, and carrying energy more efficiently. I will discuss two intriguing electromagnetic wave-matter interaction phenomena that can emerge in non-centrosymmetric solids. The first involves visible-light generation of two types of photovoltaic currents, one of which transforms, remarkably, a band insulator into a high-mobility conductor. In the second, we reimagine the energy landscape associated with a two-dimensional crystal defect that has traditionally been viewed as an impediment to