

Abstract Submitted
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Nonlinear spectroscopy of non-Abelian Berry curvature¹ FAN YANG, REN-BAO LIU, Department of Physics, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, China — We propose a general scheme to measure the Berry curvatures of energy bands in insulators by standard nonlinear optical spectroscopy. Our method employs optical and terahertz lights to produce a signal. A general calculation shows that the third order response of the solid is directly related to the Berry curvatures of the energy bands. In particular, for a time-reversal invariant system, we get a nonzero effect compared with the linear response methods, which provides information about the underlying non-Abelian Berry curvature. For insulators with rotational symmetry, the response is proportional to the Berry curvature flux of the iso-energy surface, which enables people to determine the topological properties of the energy bands explicitly. The method is applied to the eight-band model of III-V compound semiconductors and gives a quantized susceptibility with some global coefficients.

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