

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Berry curvature induced nonlinear Hall effect in time-reversal invariant materials¹ INTI SODEMANN, LIANG FU, Massachusetts Institute of Technology — It is well-known that a non-vanishing Hall conductivity requires time-reversal symmetry breaking. However, in this work, we demonstrate that a Hall-like transverse current can occur in second-order response to an external electric field in a wide class of time-reversal invariant and inversion breaking materials. This nonlinear Hall effect arises from the dipole moment of the Berry curvature in momentum space, which generates a net anomalous velocity when the system is in a current-carrying state. We show that the nonlinear Hall coefficient is a rank-two pseudo-tensor, whose form is determined by point group symmetry. We will describe the optimal conditions and candidate materials to observe this effect.

¹IS is supported by the Pappalardo Fellowship in Physics. LF is supported by DOE Office of Basic Energy Sciences, Division of Materials Sciences and Engineering under award DE-SC0010526.

Inti Sodemann
Massachusetts Institute of Technology

Date submitted: 13 Nov 2014

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