Abstract Submitted
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Anomalous Hall Effect Arising form Noncollinear Antiferromagnetism: Mn3Ir as an Example[1] HUA CHEN, QIAN NIU, ALLAN H. MACDONALD, The University of Texas at Austin — Ferromagnetic conductors exhibit anomalous contributions to their transverse (Hall) conductivities that cannot be attributed to Lorentz force on electrons from a magnetic field. The anomalous Hall conductivity is often assumed to be proportional to the magnetization, allowing transport measurements to be used in spintronics as a convenient proxy for magnetometry. However, simple symmetry arguments demonstrate that the anomalous Hall effect requires only time-reversal symmetry breaking and spin-orbit coupling, not net magnetization, and we illustrate our ideas by examining a toy model of noncollinear antiferromagnet on a two-dimensional kagome lattice. This is further backed up with a realistic example based on first-principles calculations, predicting that single-crystals of Mn_3Ir, a high-temperature antiferromagnet commenly used in spin-valve devices, have large anomalous Hall conductivities. Hua Chen, Qian Niu, and Allan H. MacDonald, arXiv:1309.4041

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