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**A First Principles Study of the Large Anomalous Hall Effect in Noncollinear Antiferromagnets $Mn_3Ge$ and $Mn_3Sn$** TZUCHENG WANG, Department of Physics, National Taiwan University, GUANGYU GUO, Department of Physics, National Taiwan University, Physics Division, National Center for Theoretical Sciences, QIAN NIU, Department of Physics, University of Texas — Anomalous Hall effect (AHE) has been thought to be present only in ferromagnetic conductors, with its size being proportional to the net magnetization. Using symmetry arguments and first principles calculations, physicists recently demonstrated that large AHE may appear in noncollinear antiferromagnets [1]. Indeed, the AHE has been recently observed in the spin liquids and antiferromagnets [2,3]. $Mn_3Ge$ and $Mn_3Sn$ are hexagonal chiral antiferromagnets with zero net magnetization which yet exhibit the large AHE being in the same order as in ferromagnets such as Fe [2,3]. Here we calculate the electronic and magnetic structure of $Mn_3Ge$ and $Mn_3Sn$ based on the density functional theory with the generalized gradient approximation. The anomalous hall conductivity of $Mn_3Ge$ and $Mn_3Sn$ are also calculated using efficient Wannier function interpolation. A microscopic understanding of such spin-related transports as AHE in noncollinear antiferromagnets could accelerate development of spintronics.

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