

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Rotating magnon wavepackets in ferromagnets and thermal Hall effect RYO MATSUMOTO, Department of Physics, Tokyo Institute of Technology, SHUICHI MURAKAMI, Department of Physics, Tokyo Institute of Technology, PRESTO, Japan Science and Technology Agency — We theoretically construct the semiclassical equation of motion of the magnon wavepacket in an insulating ferromagnets, in analogy with the electron systems. We find that the magnon wave packet has nonzero angular momentum, which consists of two parts: the self-rotational motion and the revolving motion (edge current). We show that these are expressed in terms of the Berry curvature in \mathbf{k} -space, i.e., these arise from the magnon band structure. Furthermore, we find that the thermal Hall effect of the magnon is totally due to the magnon edge current, and present an intuitive picture of the thermal Hall effect. We also construct the linear response theory for the thermal Hall effect, and compare the results with the previous works with an example of $\text{Lu}_2\text{V}_2\text{O}_7$.

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Date submitted: 24 Nov 2010

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