Dynamics of wavepacket of magnetostatic spin wave in magnet

RYO MATSUMOTO, SHUICHI MURAKAMI, Tokyo Institute of Technology — A semiclassical equation of motion of a wave packet of the magnetostatic spin wave is theoretically constructed. There appears the Berry curvature as an anomalous velocity term in the equation of motion, which causes characteristic orbital motions of the wave packet such as a self-rotational motion and a motion along the edge of the system. Due to the symmetry, the Berry curvature in the case of a thin film of an insulating ferromagnet appears when the magnetization is perpendicular to the film. We show a numerical calculation of the Berry curvature for this mode, i.e., the magnetostatic forward volume wave mode. Around the degeneracy point, the Berry curvature from the highest energy band enhances and that from other bands decreases. We also propose experimental settings to observe this effect.

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