Wave properties of spin waves in confined magnetic thin films

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Dynamic spin waves observed in variously shaped magnetic thin-film elements have been intensively studied because of their fundamental interests and potential applications to ultrafast logical operations[1,2,3]. From a technological point of view, their wave behaviors of radiation and propagation at ultrafast speeds through variously shaped magnetic waveguides such as a nanowire have the potential to be used in one of the next generations of logic devices. In this talk, we report on the wave characteristics of spin waves, such as the behaviors of radiation, propagation, reflection, transmission, dispersion, and the filtering of specific frequencies. In addition, we demonstrate the superposition principle of spin waves by reproducing spin-wave interference patterns, which are similar to the wave interference observed in the well-known Young's double slit experiment with light. We propose a possible logic device that uses these wave properties demonstrated here.

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