

Abstract Submitted
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Interplay between conduction electron spin current and magnon spin current¹ SHULEI ZHANG, SHUFENG ZHANG, Department of Physics, University of Arizona — Spin current is a flow of angular momentum that can be carried by conduction electrons as well as magnons. In conducting ferromagnets, both electron spin currents and magnon currents are present. By using a semiclassical description for conduction electrons and magnons, we evaluate the distribution functions of the non-equilibrium electrons and magnons in the presence of electron-magnon interactions. In some interesting limiting cases, we have derived novel diffusion equations for both electrons and magnons. We then apply our formalisms to study the spin currents for various bilayer and trilayer systems. In particular, we predict how an electron spin current in a metallic layer can be converted into a pure magnon current in a ferromagnetic insulator layer at interface. We also discuss possible experimental realizations for non-equilibrium magnon currents.

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