

Abstract: In this talk, we discuss a theory for non-local spin transport through magnetic insulators that treats the coherent magnetoelastic interaction on equal footing with incoherent relaxation processes. In particular, our theory is able to describe the formation of magnon-polarons, hybridized spin and elastic waves, near an interface where spin is injected into the magnetic insulator. Our theory is based on the stochastic Landau-Lifshitz-Gilbert equation coupled to stochastic equations of motion for the lattice displacement. We show that though magnon-polaron formation causes anomalous features in the spin transport, a length scale exists, however, below which magnetoelastic coupling does not affect the non-local spin current. This finding may motivate experiments to explore this aspect of magnon-phonon coupling in magnetic materials.