Heat Transport between Antiferromagnetic Insulators and Normal Metals

EIRIK LOHAUGEN FJAERBU, HANS SKARSVAAK, ERLEND G. TVETEN, ARNE BRATAAS, Norwegian University of Science and Technology (NTNU) — Antiferromagnetic insulators can become active spintronics components by controlling and detecting their dynamics via spin currents in adjacent metals. This cross-talk occurs via spin-transfer and spin-pumping, phenomena that have been predicted to be as strong in antiferromagnets as in ferromagnets. In a recent article, we demonstrate that a temperature gradient drives a significant heat flow from magnons in antiferromagnetic insulators to electrons in adjacent normal metals. The same coefficients as in the spin-transfer and spin-pumping processes also determine the thermal conductance. However, in contrast to ferromagnets, the heat is not transferred via a spin Seebeck effect which is absent in antiferromagnetic insulator-normal metal systems. Instead, the heat is proportional to a large staggered spin Seebeck effect.