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Spin Seebeck Effect in a Compensated Ferrimagnet SEBASTIAN T.B. GOENNENWEIN, S. GEPRÄGS, Walther-Meissner-Institut, Garching, Germany, A. KEHLBERGER, T. SCHULZ, C. MIX, University of Mainz, Mainz, Germany, F. DELLA COLETTA, S. MEYER, Walther-Meissner-Institut, Garching, Germany, A. KAMRA, Kavli Institute of Nanoscience, Delft, The Netherlands, G. JAKOB, University of Mainz, Mainz, Germany, M. ALTHAMMER, H. HUEBL, R. GROSS, Walther-Meissner-Institut, Garching, Germany, M. KLÄUI, University of Mainz, Mainz, Germany — Thermal gradients allow for driving pure spin currents in electrically insulating magnetic materials. In magnetic insulator/normal metal heterostructures, such thermally driven spin currents can be electrically detected via the inverse spin Hall effect in the normal metal, in so-called spin Seebeck effect (SSE) experiments. We have fabricated Gadolinium Iron Garnet/Platinum (GdIG/Pt) thin film heterostructures, and measured the spin Seebeck effect in these samples as a function of temperature. We observe two sign changes as a function of T in the SSE signal. The first sign change occurs around the GdIG magnetic compensation temperature, and can be straightforwardly understood in terms of the reorientation of the iron sublattice magnetizations at this temperature. The second, more gradual SSE sign change takes place around the ordering temperature of the Gd magnetic sublattice, suggesting that the thermally driven spin current is mainly determined by the Gd sublattice at low T. Our results thus show that the SSE spin currents do not simply replicate the effective magnetization of the magnetic insulator, but rather reflect a complex interplay of magnetic sublattice properties.

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