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Thermoelectric transport and thermal spin currents in ferromagnetic films and nanostructures AZURE AVERY, RUBINA SULTAN, BARRY ZINK, University of Denver — For fundamental physics, understanding the mechanisms behind giant magnetoresitance (GMR) and its related properties, magnetoresistance (MR) and magnetothermopower (MTEP), is crucial, especially for nanoscaled structures. Though progress has been made in understanding electron transport through magnetic thin films and multilayers, far less is understood about the mechanisms behind thermal transport in these systems. This is due, in part, to the difficulty of measuring thermal properties of these low-dimensional systems. We present a robust technique for accurately measuring thermal conductivity ($k_{\|}$), thermopower (α), and MTEP in nanoscale magnetic materials using micromachined silicon nitride thermal isolation structures. We outline the fabrication of the structures and present our measurement results for ferromagnetic thin films and nanowires. Finally, we present how this technique is applied to testing the validity of current models explaining the mechanisms of thermal transport, such as thermal spin currents, in ferromagnetic films and nanostructures.

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