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Spin Seebeck effect in bulk composite materials[1] STEPHEN BOONA, The Ohio State University, KOEN VANDAELE, Ghent University, ISABEL BOONA, DAVID MCCOMB, JOSEPH HEREMANS, The Ohio State University — To date, the spin Seebeck effect (SSE) has been studied almost exclusively in heterostructures comprised of ferromagnetic insulators capped with metallic thin films, with each component carefully crafted to ensure mutual orthogonality of the relevant interfaces, fields, and fluxes. If the ferromagnetic material is conducting, then the anomalous Nernst effect (ANE) is also present, and the two effects combine to enhance the total transverse thermopower. This talk will present the first demonstration of this exact same phenomenon in bulk materials wherein metallic nanoparticles (Pt or Au) are randomly embedded within a conducting ferromagnet (Ni or MnBi) [1]. These composites allow electrical current to be extracted through their entire volume and thus have lower impedance than thin films, and their forgiving morphology means they can be produced using low cost and scalable techniques. Together, these factors make bulk composites a viable pathway for applying SSE toward thermal energy conversion in devices capable of producing power at the W to kW level. After providing proof-of-concept for SSE in bulk materials, the talk will conclude with an update on recent progress and a discussion of how the effect may be further enhanced. [1] Boona, et al., Nature Commun. [in press] (2016), arXiv:1604.05626

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