THE UNIVERSITY OF DENVER

Department of Physics & Astronomy

Presents

Heat, Charge, and Spin: What's Hot in Thermoelectrics, Spintronics, and Magnetic Materials

Wednesday, October 7, 2015
4:00 PM
F.W. Olin Hall Room 105
2190 E. Iliff Avenue

Presented by

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Interest in spincaloritronics, the interaction of heat, charge, and spin currents in ferromagnetic (FM) systems, continues to grow. This is driven by potential applications not only in spin current generation for future spintronic circuits, but possible energy-harvesting devices that could use transport in the spin channel to overcome the coupling of thermal and electrical conductivity that has long confounded the search for more efficient thermoelectric materials. However, potential optimization of these effects and eventual applications of spincaloritronic devices is possible only if the fundamental interactions are understood. Furthermore, the effect of materials and interface structure on the resulting spincaloritronic properties must be determined. Our research focuses on advancing this understanding, with a particular emphasis on accurate control and measurement of thermal gradients on the thin films or nanostructures often of greatest interest. Reliable measurements of thermally-driven effects in such samples with tiny thermal mass often require great care. In this talk Prof. Zink will first briefly advertise work on thermal spin injection in nanofabricated metallic structures, correlation of the planar Hall and planar Nernst effects in larger suspended ferromagnetic thin films, spin transport through magnetic oxides, and heat flow in carbon nanotube/polymer hybrid materials for potential thermoelectric energy harvesting. He will then focus on a more in-depth discussion of careful examinations of the Wiedemann-Franz relation between heat and charge flow in ferromagnetic metals and other thin films, which often show deviations from expected behavior that are important for understanding thermal effects in spintronic systems and could point toward a route for improving the performance of thermoelectric materials.

HOST: Dr. Mark Siemens, (303) 871-3541, Mark.Siemens@du.edu
Join us for refreshments & follow-up discussions in Physics Building Room 116, 5:00-6:00 PM