2014 Spring Departmental Research Seminar

Title: Bulk thermoelectric materials: From phonon dynamics to electronic transport

Time: 6-Feb, Thursday 11:00~11:50 am.

Place: AIME 110 (coffee and snacks will be provided)

Speaker:

Andrew F. May  
Research Staff  
Correlated Electron Materials Group  
Materials Science & Technology Division  
Oak Ridge National Laboratory

Abstract: Thermoelectric research efforts remain strong due to the constant need for greater energy efficiency, as well as the increasing role of thermoelectrics in niche applications. This talk will review thermoelectricity in bulk materials, with an emphasis on fundamental studies of thermal and electrical transport. The nominally cubic compounds AgSbTe₂ and PbTe/SnTe will be examined from the perspective of lattice dynamics and intrinsically low thermal conductivity, where nanoscale ordering in AgSbTe₂ and anharmonicity in PbTe play significant roles. The analysis and modeling of electrical transport data will also be discussed, with the importance of impurity band conduction and phonon drag in CrSb₂ being highlighted. Research supported by the U. S. Department of Energy, Office of Basic Energy Sciences, Materials Sciences and Engineering Division.

Biography: Andrew May obtained his bachelor’s degree in Chemical Engineering from Penn State in 2004, and master’s and doctoral degrees in the same discipline from Caltech. After investigating polymer dynamics at Penn State, his graduate research focused on thermoelectrics and was performed primarily at NASA’s Jet Propulsion Laboratory. These studies earned him the 2010 Goldsmid Award from the International Thermoelectric Society, as well as a best thesis prize at Caltech. He joined ORNL in 2010 as a postdoctoral scholar, and became a member of the staff in 2013. While at ORNL, his research interests have expanded to include magnetic materials and superconductors, with an emphasis on the growth and characterization of single crystals.