北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Weekly Seminar

Neutron Scattering Study of the Temperature-Dependent Phonon Spectra of $AgSbTe_2$

Oak Ridge National Laboratory

Time: 4:00pm,Dec.12, 2012 (Wednesday)
2012 12 12 4:00

Venue: Room 607, Conference Room A , Science Building 5
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Abstract

The thermoelectric material $AgSbTe_2$ has attracted much attention due to the simple rocksalt structure, the high thermoelectric figure-of-merit, and the low thermal conductivity. Using the neutron scattering technique, we survey the phonon spectra across the entire Brillouin zone, and reveal a spontaneously-forming nanostructure in crystalline $AgSbTe_2$, which leads to a suppression of thermal conductivity to a glass-like level. In particular, our phonon measurement provide a quantitative account of the bulk thermal conductivity, and also present the microscopic anisotropies associated with nanostructure, which are not accessible to bulk probes. The anomalously low thermal conductivity of $AgSbTe_2$ is shown to arise from the formation of short-range ordered nanodomains on the Ag/Sb cation sublattice, and additional stacking faults. The spontaneous formation of the nanostructure alleviates the need to artificially introduce nanostructural features in this material. These results point to avenues for designing new low-thermal conductivity materials for efficient thermoelectric and phase-change applications.

About the Speaker

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