

# QPEC—G-COE Seminar



量子相エレクトロニクス研究センター



G-COE プログラム—未来を拓く物理科学結集教育研究拠点—

## “Interesting Electronic Materials: Thermoelectrics and high-T<sub>c</sub> superconductors”

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日時：2012年1月13日（金） 15:00 - 16:30

場所：工学部6号館1階大会議室（103号室）

### ABSTRACT

The  $(\text{Bi}_2)_m(\text{Bi}_2\text{Te}_3)_n$  infinitely adaptive series is built from  $\text{Bi}_2\text{Te}_3$  and  $\text{Bi}_2$  blocks that can be combined in almost any desired ratio. Both end-members are good thermoelectric materials and have also attracted interest as topological insulators. However, little is known about the intermediate phases. The formation, structures and properties of these interesting natural superlattice materials will be discussed.

Compositions near  $\text{Bi}_2\text{Te}$  ( $m:n = 2:1$ ) are p-type and show some promise for thermoelectric refrigeration, while substitution of Mn in  $\text{BiTe}$  ( $m:n = 1:2$ ) yields low temperature ferromagnetism.

The iron based superconductors have attracted enormous interest since their discovery in 2008. A comparison of the physical properties, crystal and magnetic structures of the 1111-type  $\text{RMA}_2\text{O}$  materials with  $\text{R} = \text{Nd}$  and  $\text{M} = \text{Mn}, \text{Fe}$  and  $\text{Co}$  materials will be presented. The determination of the magnetic structures has been aided by symmetry analysis. The  $\text{M} = \text{Mn}$  material undergoes a spin-reorientation transition upon ordering of the Nd moments, while  $\text{M} = \text{Co}$  changes from ferromagnetic to antiferromagnetic. The coupled Nd and Fe ordering in  $\text{NdFeAsO}$  has also been revisited.

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