

Condensed Matter Theory Center Seminar



Tuesday, December 8
11:00 am – 12:30 pm
2205 Toll Physics Building

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CNAM and Dept of Physics, University of Maryland

“Topological half-Heusler semimetals: a new family of non-centrosymmetric magnetic superconductors”

Abstract: We report superconductivity and magnetism in the ternary half Heusler compounds $RPdBi$ (R : rare earth). In this series, tuning of the rare earth f-electron component allows for simultaneous control of both lattice density via lanthanide contraction, as well as the strength of magnetic interaction via de Gennes scaling, allowing for a unique tuning of both the normal state band inversion strength, superconducting pairing and magnetically ordered ground states. Antiferromagnetism with ordering vector $(0.5,0.5,0.5)$ occurs below a Néel temperature that scales with de Gennes factor, while a superconducting transition is simultaneously linearly suppressed. With superconductivity appearing in a system with non-centrosymmetric crystallographic symmetry, the possibility of spin-triplet Cooper pairing with non-trivial topology analogous to that predicted for the normal state electronic structure provides a unique and rich opportunity to realize both predicted and new exotic excitations in topological materials.

Host: Jed Pixley

Web: <http://www.physics.umd.edu/cmte/seminars.html>

