

WICHITA STATE UNIVERSITY

Physics Seminar Presents Our Speaker:

Dr. Halyna Hodovanets

University of Maryland, College Park

“Tuning of Magnetism in $4f$ -based Correlated Electron Systems”

Abstract: Rare-earth elements in the intermetallic compounds display wealth of fascinating properties. Among these compounds, Ce- and Yb-based systems are of particular interest because they often show anomalous electronic and magnetic properties. The competition between Ruderman-Kittel-Kasuya-Yosida interaction and Kondo effect leads to variety of ground states including exotic magnetism and unconventional heavy-fermion superconductivity. The antiferromagnetic ground state of these compounds can be tuned through a quantum phase transition into a heavy-fermion state by chemical substitution, magnetic field and application of pressure. Heavy-fermion materials involve the dense lattice analog of single-ion Kondo effect and are often called Kondo lattice compounds. The common knowledge is that the Kondo lattice state is easily suppressed once the Ce-sublattice is diluted with La. I will discuss La dilution of Kondo lattice CeCu_2Ge_2 as an example of chemical substitution tuning where we discovered remarkably low (only 9% of Ce) percolation limit for the Kondo lattice and single-ion Kondo effect.

Most recently, rare-earth intermetallics were theoretically predicted to host new physics. Specifically, CeAlGe and PrAlGe were proposed as new potential candidates of Weyl semimetals that break both inversion and time-reversal symmetries. In this regard, I will present the first single crystal investigation of magnetic, thermodynamic and transport properties of CeAlGe and discuss whether CeAlGe fits this prediction.

Day & time:

Wednesday, March 20, 2019

2:00 p.m., 128 Jabara Hall

Refreshments & Discussion Afterwards

Supported by the Eddy and April Lucas Fund, Wichita, Kansas