

# WICHITA STATE UNIVERSITY

*Physics Seminar Presents Our Speaker:*

## **Dr. Kapildeb Ambal**

University of Maryland, College Park

### **“Imaging, Spectroscopy and Applications of Solid State Spins”**

**Abstract:** Point defects such as impurities and vacancies give semiconductors their useful properties and they also provide qubits for modern quantum devices. On the other hand, point defects also have bad effects including inefficiency and device failure. Therefore, investigating these defect states for their physical properties will improve understanding of how these mesoscopic features control device properties and this information would have many applications in emerging technologies such as photovoltaic, magnetic technology, quantum sensing and quantum information science.

At the beginning of my presentation I will focus on the imaging and spectroscopic measurement of individual defect states using a newly developed force microscopy technique. This measurement is based on the spin dependence of electron tunneling, which is expected to reveal spin states of individual point defects. A conceptual overview of this technique will be presented. While the complete microscope has not been demonstrated yet, implementation has passed several milestones such as development of a suitable readout probe and images of individual phosphorus donor electronic states.

Towards end of my presentation I will talk about various solid-state spins and their applications. Particularly, I will focus on that how solid-state spins will be used to sense magnetic field, to measure nuclear hyperfine fields and to quantify spin-orbit interaction in condensed matter systems.

### **Day & time:**

Wednesday, February 27, 2019

2:00 p.m., 128 Jabara Hall

Refreshments & Discussion Afterwards