CMP Seminar
Michigan State University

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Nanoscale investigation of strongly correlated oxide materials

Strongly correlated materials display a rich variety of phenomena, including superconductivity, giant magnetoresistance and metal-insulator transitions, as strong interactions lead to competing ground states. Vanadium oxide is a prototypical correlated electron material that exhibits a large metal-insulator transition (MIT) close to room temperature. The scientific interest in this material lies in understanding the fundamental mechanisms that are responsible for driving the transition. The large resistive switching and the convenient temperature make this a potential material in electrical and electro-optic applications as switches and memory elements.

In this talk, I will present results from our studies on transport properties of single nanobeam devices of vanadium dioxide and epitaxial thin films of nickelates. We seek to control and understand the MIT using several tuning parameters such as temperature, metal doping and electric field. Probing these materials in the nanoscale and the application of noise spectroscopy allow us to distinguish between possible physical mechanisms that are responsible for the transition and to explore the nonequilibrium physics of correlated materials.

Monday, March 30, 2015
4:10 p.m.
BPS 1400
Prof. Chong-Yu Ruan