CMP Seminar
Michigan State University

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Using Ultrashort Light Pulses to Directly Probe Complex Quantum Materials

Ultrafast optical spectroscopy has attained prominence due to its ability to resolve dynamics in conventional metals and semiconductors at the fundamental time scales of electron and lattice motion. In recent years, ultrafast optical techniques have become more sophisticated, making it possible to directly access fundamental material parameters in a non-contact manner. In this talk, I will begin with an overview of concepts in ultrafast optical spectroscopy, including both conventional and more recently developed experimental techniques. I will then describe the use of ultrashort optical pulses to unravel the coupling between magnetic and ferroelectric order in multiferroic oxides. Finally, I will demonstrate that ultrashort light pulses can also enable us to probe and even control the properties of topological materials. Overall, our studies demonstrate the utility of ultrafast optical spectroscopy in shedding light on both static and dynamic properties of complex quantum materials.

Biography:
Dr. Rohit P. Prasankumar received a B.S. in Electrical Engineering from the University of Texas at Austin in 1997 and the M.S. and Ph.D. degrees in Electrical Engineering from MIT in 1999 and 2003, respectively. His thesis work, completed in 2003, concentrated on developing novel approaches for self-starting mode-locking in solid state lasers. Dr. Prasankumar subsequently performed his postdoctoral research at Los Alamos National Laboratory (LANL), focusing on ultrafast mid-to-far-infrared dynamics in semiconductor nanostructures and strongly correlated compounds. He has been a technical staff member at the Center for Integrated Nanotechnologies (CINT) at LANL since 2006, with research interests principally directed towards the measurement of dynamics in complex materials, such as multiferroics, semiconductor nanowires, and topological materials, with high temporal and spatial resolution over a broad spectral range. He was also appointed as an Adjunct Assistant Professor at the University of New Mexico in 2008.

Monday, September 18, 2017
4:10 p.m.
BPS 1400
Prof. Chong-Yu Ruan - Host