



**Wednesday**  
**September 25, 2013**  
**4:00 pm**  
**Room 1200**  
**EECS Building**

**Prof. Edward Thomas**

Auburn University

## **Magnetized Dusty Plasma Experiment: A User Facility for Complex Plasma Research**

A dusty (or complex) plasma is a four-component system consisting of electrons, ions, neutral atoms, and charged, nanometer to micrometer sized particles (“dust”). Because the dust grains are charged, they participate in plasma dynamics and can be used to study transport, instabilities, and charging properties of plasmas. One important area that has not been extensively studied is magnetized dusty plasmas. Even though dust grains in lab experiments have several thousand charges, the charge-to-mass ratio is low. It is technically challenging to achieve full magnetization of ions, electrons, and the charged dust grains. In 2011, the NSF funded the first mid-scale, multi-user research facility for the study of dusty plasmas. The mission of the Magnetized Dusty Plasma Experiment (MDPX), based at Auburn University in collaboration with the U. of Iowa and U. of California – San Diego, is to study the properties of dusty plasmas in which the magnetic force on the charged micro-particles is comparable to the other plasma forces. MDPX will produce highly uniform as well as shaped magnetic fields above 4T. This presentation will provide a brief overview of the development of magnetized dusty plasma experiments, highlighting recent studies at Kiel and Garching, will discuss the capabilities and diagnostic development of MDPX, and hopefully present some of the initial measurements performed using the MDPX facility.

**About the Speaker:** Edward Thomas, Jr. earned the BS in Physics from the Florida Inst. of Tech., MS in Physics from MIT, and his Ph.D. in Physics from Auburn Univ. He was an Asst. Prof. at Fisk Univ. before returning to Auburn in 1999 as a faculty member in the Physics Dept. where he is now the Lawrence C. Wit Professor in the College of Sciences and Mathematics. Prof. Thomas’ group conducts experimental plasma physics research focusing on complex (dusty) plasmas, magnetized plasmas and fusion science. Prof. Thomas is active in science policy and outreach through his work with the American Physical Society, Natl. Society of Black Physicists, University Fusion Association, International Union of Radio Science, and Quality Education for Minorities; and serving on advisory committees for NSF, DOE, and research centers in the US and Europe.