

SOCIETY OF PHYSICS STUDENTS (SPS) SEMINAR

**Graduate Student Research**  
**Presentation: *In-situ* Light Scattering**  
**Measurements of FeOOH spindles in**  
**solution.**

*Phil Dee*, Physics (SPS president)

Characterizing spindle-shaped (nanorice) particles of iron (III) oxyhydroxide (FeOOH) with the Depolarized Dynamic Light Scattering (DDL S) provides an accurate and reliable estimate for nanoparticle size, shape, and dynamics in a native colloidal solution. Specific applications such as targeted synthesis of core/metal nanoshell structures for techniques such as laser photothermal therapy suggest that there's advantage to *in situ* measurements of FeOOH nanoparticles. FeOOH can also serve as a standard/control system for light scattering characterization of hard-to-image soft-matter particles of certain anisotropic geometries. The analytical geometrical models of prolate spheroid and short cylinder were employed to analyze rotational and translational light scattering data yielding nanoparticle structure and dynamics. The methods utilizing a straight cylinder model created by de la Torre, proved to be most consistent with TEM and SEM size distributions. Three independently synthesized FeOOH colloidal solutions with particle size aspect ratios of 3.5-4.6 produced the apparent size estimates similar to TEM and SEM results. The sensitivity of measurements to filtration protocol, optical parameters, number concentration of FeOOH nanoparticles, as well as the role of the geometrical model assumptions on the data analysis were also studied.

**Pizza and Soda are provided!**

**WHERE: SR - 151**

**WHEN: Noon**

**Thursday, February 6, 2014**

