Physical Chemistry Seminar

Tuesday, March 9, 2010 | **11:00 a.m.** | **Room 1315 Chemistry Building**

Super-Resolution Fluorescence Imaging of Intracellular Structure and Dynamics

Professor Samuel T. Hess

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Diffraction limits resolution in visible light microscopy to ~200-250 nanometers. However, many biological functions are regulated at the molecular level. FPALM (fluorescence photoactivation localization microscopy), breaks the diffraction limit and achieves effective lateral resolution of 10-40 nanometers. FPALM performs successive rounds of photoactivation, imaging, localization, and photobleaching, to obtain the coordinates of large numbers of probe molecules. The image is then reconstructed using the measured positions of all localized molecules. Biological applications of FPALM to intracellular membrane, cytosolic, nuclear, and cytoskeletal proteins have been demonstrated, including results from live cells, fixed cells, and fixed tissue. Dynamics of individual molecules, including trajectories, can be recorded and quantified do determine molecular diffusion properties or velocities. Three-dimensional imaging using Bi-plane FPALM has recently been demonstrated to yield 30 nm x 30 nm x 70 nm resolution. Polarization FPALM can measure both the positions and orientations of localized probe molecules in biological samples, and has been used to image cytoskeletal and membrane proteins in cells. These powerful capabilities offer great potential for biological applications.

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

Graduate Students may meet with the speaker at 1:15 p.m. in Room 8305f