Poster Presentation P37

A NOVEL METHOD FOR SUPER-RESOLUTION OPTICAL MICROSCOPY

Brett Parmenter and Gabriel C. Spalding*
Department of Physics, Illinois Wesleyan University
Department of Physics, Northwestern University

Even neglecting aberrations, conventional optical microscopes are limited (essentially by the uncertainty principle) to a resolution on the order of the wavelength of light used. The Near-Field Scanning Optical Microscope (NSOM) is able to overcome this fundamental limitation, by using evanescent fields. The most common NSOM design uses a fiber optic pulled down to a very fine tip with a sub-wavelength aperture at the end. The resolution of this type of microscope is limited only by the size of the aperture used. Unfortunately, as shown by Hans Bethe, the intensity of the light allowed through a sub-wavelength aperture falls off as the sixth power of the radius. Our alternative uses an optically trapped, resonant nanoparticle as a sub-wavelength, scanned probe. We expect to achieve super-resolution with improved signal-to-noise.