



ISS Installs the First Instrument for Scanning FCS and Particle Tracking

CHAMPAIGN, ILLINOIS—April 17, 2004—Abbott Laboratories of Abbott Park, Illinois, took delivery of the first instrument for scanning FCS and particle tracking. The instrument is intended to follow the complex molecular dynamics of molecules in cells, as well as to determine trajectories of single molecules in solutions. The tracking can be achieved by locking directly onto the target fluorophore or fluorophores (acceptors) that have been excited by donors (FRET, fluorescence resonance energy transfer).

The instrumentation technique is the same utilized for scanning confocal microscopy and implemented in the ISS Alba. A multiphoton laser at a wavelength resonant with the absorption of the fluorescent probe is used as light source. The beam is diverted into an epifluorescence microscope and it is delivered to the sample that is held in microwell plates or Petri dishes. An observation volume of the order of 1 femtoliter is created by the 2-photon excitation; the observation volume scans an area of 40 x 40 μm at the exit of the microscope objective with no distortions. Fast data acquisition is achieved along the path followed by the beam and fluorescence correlation spectroscopy analysis is applied to the data.

“This instrument opens a whole new set of applications in complex cellular systems conducive to the understanding of important biological mechanisms at the molecular level” according to Dr. Jeff Liao, the ISS Research Scientist responsible for the development of the novel instrument. “Yet, we also envision applications of this instrument in other fields, such as the understanding of complex aerodynamics effects and turbulence phenomena where the fast non-invasive and non-intrusive tracking of particle is essential”.

The new instrument, called “Scanning FCS” complements the series of modules introduced by ISS for confocal microscopy and fluorescence correlation spectroscopy. The series is based around Alba, the confocal microscope for imaging (steady-state and lifetime) and FCS. Alba can be utilized in solutions or in cells with single-photon or multi-photon excitation. In its basic configuration, it can deliver a confocal image; the instrument can be upgraded with FLIM and FCS capability. The instrument is available in two basic modes of operation: the user has the choice of scanning laser beam (for fast imaging) or fixed beam with piezo-controlled stage (for the highest sensitivity and large undistorted area).