

INVESTICE DO ROZVOJE VZDELÁVÁNÍ

Zapojení regionálního centra pokročilých technologií a materiálů do mezinárodních sítí nanotechnologického a optického výzkumu.

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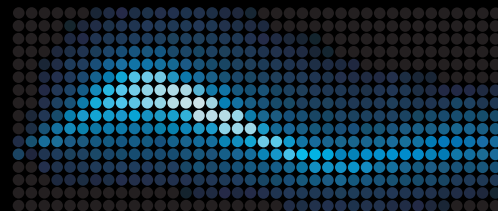
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REGIONÁLNÍ CENTRUM POKROČILÝCH TECHNOLOGIÍ A MATERIÁLU - ODBORNÝ SEMINÁŘ

Datum: 14.7.2014, čas: 13:00, místo: seminární místnost RCPTM, Šlechtitelů 11, Olomouc-Holice

Prof. Nils G. Walter

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Single Molecule Biophysics: RNA Splicing and DNA-Directed Enzyme Cascades

Abstract: Nature and Nanotechnology likewise employ nanoscale machines that self-assemble into structures of complex architecture and functionality. Fluorescence microscopy offers a non-invasive tool to probe and ultimately dissect and control these nanoassemblies in real-time. In particular, single molecule fluorescence resonance energy transfer (smFRET) allows us to measure distances at the 2-8 nm scale, whereas complementary super-resolution localization techniques based on Gaussian fitting of imaged point spread functions (PSFs) measure distances in the 10 nm and longer range. Here, I will describe how we used smFRET to show that single spliceosomes responsible for the accurate removal of all intervening sequences (introns) in pre-messenger RNAs are working as biased Brownian ratchet machines. On the other end of the spectrum, we have utilized smFRET and super-resolution fluorescence microscopy to monitor enhanced enzyme cascades engineered to self-assemble on DNA origami. We can even "PAINT" these "nanopegboards", and watch them at super-resolution diffuse as DNA barges over supported lipid bilayers, one molecule/particle at a time.