Tampere University

PREIN

2nd Juhannus Distinguished Lecture in Physics

by

Nobel Laureate Prof. Stefan Hell

The Physics Unit of Tampere University is proud and honoured to announce, that

Prof. Stefan Hell

Max Planck Institute for Multidisciplinary Sciences, Göttingen, Germany
Max Planck Institute for Medical Research, Heidelberg, Germany

will give a **public lecture** at Tampere University

Thursday, June 12th at 17:00 o'clock
Main Auditorium A210 – City Centre Campus, Main Building

Nobel Laureate Prof. Stefan Hell is a director at both the Max Planck Institute for Multidisciplinary Sciences in Göttingen and the Max Planck Institute for Medical Research in Heidelberg, Germany. For his accomplishments in revolutionizing microscopy, he has received numerous awards, including the 2014 Kavli Prize in Nanoscience and the Nobel Prize in Chemistry. Prof. Stefan Hell also has a close connection to Finland, as he developed his Nobel prize awarded microscopy idea during his three year stay as a senior researcher at the University of Turku, Finland.

In his public lecture, Prof. Stefan Hell will introduce the ideas behind super-resolution microscopes, which have overcome resolution barriers to observe the world on the nanometer scale using light. Since his invention of different strategies to realize what has commonly thought impossible, these new approaches are increasingly used as powerful tools for biomedical research and studies of biological function on the molecular level.
In particular, Prof. Hell will talk about:

Molecule-scale resolution and dynamics in fluorescence microscopy

I will discuss MINFLUX, a recent molecular localization and superresolution method that has reached Angström localization precision and resolution of the size of a fluorophore molecule. MINFLUX and the related MINSTED concept are being established for routine applications in cell and molecular biology, structural biology and neuroscience. Relying on much fewer fluorescence photons than the widely used camera-based localization methods, these techniques are poised to characterize dynamic processes of single proteins, as demonstrated by tracking the nanometer conformational changes of the motor proteins kinesin-1 and dynein in living cells. MINFLUX has also been demonstrated to measure intramolecular distances with Angström precision, providing a precise and reliable alternative to FRET. Harnessing confocal detection, MINFLUX also provides nanometer-range resolution deeper down in layers of cells and (mildly) scattering tissue. Finally, I will show an arguably surprising ability of MINFLUX to separate individual identical fluorophores without sequential ON/OFF switching or activation of fluorescence. Thus, the simultaneous, uninterrupted, nanometer-scale tracking and imaging of multiple, identical (same-color) fluorophores becomes possible for the first time. This novel superresolution principle should allow MINFLUX to reveal the conformational changes of individual proteins in their native environment.