11:00am, Thursday September 24th 2026
Ecole Polytechnique
#84 building, room 84-20-28

Dan Oron

Dept. of Molecular Chemistry and Materials Science
Weizmann Institute of Science, Rehovot, Israel
http://www.weizmann.ac.il/complex/DOron/

Superresolution confocal optical microscopy based on attributes beyond the intensity of light

Far-field optical microscopy beyond the Abbe diffraction limit is already a reality. In the context of confocal imaging, Image Scanning Microscopy (ISM), offering an up to twofold increase in resolution is now commonplace (Zeiss Airyscan, Nikon NSPARC). This raises a question – can we further extend the use of such platforms to further enhance resolution or to enhance resolution in other imaging modalities such as coherent nonlinear microscopy. I will show how we increase the resolution of a standard confocal fourfold, with a twofold axial resolution increase by harnessing the quantum phenomenon of fluorescence antibunching and by its classical analog of fluorescence intermittency. Further, the differences between coherent and incoherent imaging, and the necessary route towards extension of this modality to coherent imaging (SHG, CARS), involving phase sensitive detection, will be discussed. As will be shown, the hardware and software advances required to make this a more ubiquitous tool in bioimaging are becoming readily available, offering a unique potential pathway towards confocal imaging with increased performance without sacrificing the simplicity and ease of the confocal microscope.