

# **OPTICAL MICROSCOPY WITH HIGH SPATIO-TEMPORAL RESOLUTION: DISSECTING MOLECULAR MEMBRANE DYNAMICS**

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Molecular interactions are key in cellular signaling. They are usually ruled by the organization and mobility of the involved molecules. We present a combined fluorescence and scattering microscopy study to determine such information and potentially extract interaction dynamics. Specifically, the direct and non-invasive observation of the interactions in the living cell is often impeded by principle limitations of conventional far-field optical microscopes, for example with respect to limited spatio-temporal resolution. We depict how novel details of molecular membrane dynamics can be obtained by using advanced microscopy approaches such as the combination of super-resolution STED microscopy with fluorescence correlation spectroscopy (STED-FCS), spectral detection, interferometric scattering (iSCAT) and novel MINFLUX microscopy. We highlight how these approaches can reveal novel aspects of membrane bioactivity such as of the existence and function of potential lipid rafts.