

Application of photothermal microscopy to the study of cells

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Fluorescent probes enable the detection of specific components in complex environments at superior sensitivity and selectivity. Alongside they are used to measure for example distances, temperatures, mobilities and biophysical properties. In all these application the observation time is limited by photooxidation which on one hand bleaches the fluorescent probe on the other hand also alters the environment by creating radicals. One approach to solve that challenge is to use absorbing metallic nanoparticles that efficiently interact with light. They are very stable and can easily be detected by their scattering or absorption.

Optically heated metallic nanoparticles are already used as label and for local manipulations. We are currently extending photothermal microscopy to perform quantitative thermal diffusivity measurements which are based on the consistent modelling of the photothermal signal being recorded in the experiment. In the future we are will implement live tracking of gold nanoparticles using photothermal microscopy to perform thermal diffusivity measurements in the whole cell and well controlled temperature manipulations at distinct locations.