

## **Light control – how tailored light fields assemble nano particles or analyse cells**

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Light can hold, move and measure micro- and nano particle without touching. Optical tweezers exploit focused laser light to measure forces at the nanoscale and quantify elasticity. Complex tailored light field based on holographic principles allow extending this application range, making holographic optical tweezers to an extraordinary metrology tool for analysis in biophysics and biophotonics.

This way, three dimensional configurations of micro- and nano particles can be generated in parallel and dynamically modified, creating spatially selective sensors. Also, droplets of fluids can be manipulated by tailored light cages.

Particles can also be introduced into cells to study cellular mechanics in a spatially resolved way, thus paving the way to decipher origins of cell migration and morphogenesis or analyse infections and inflammation.

In this presentation, we will introduce the principles of holographic optical tweezers and subsequently demonstrate how to use complex light fields for applications in soft matter, biophotonics and medical cell diagnosis.