WWU

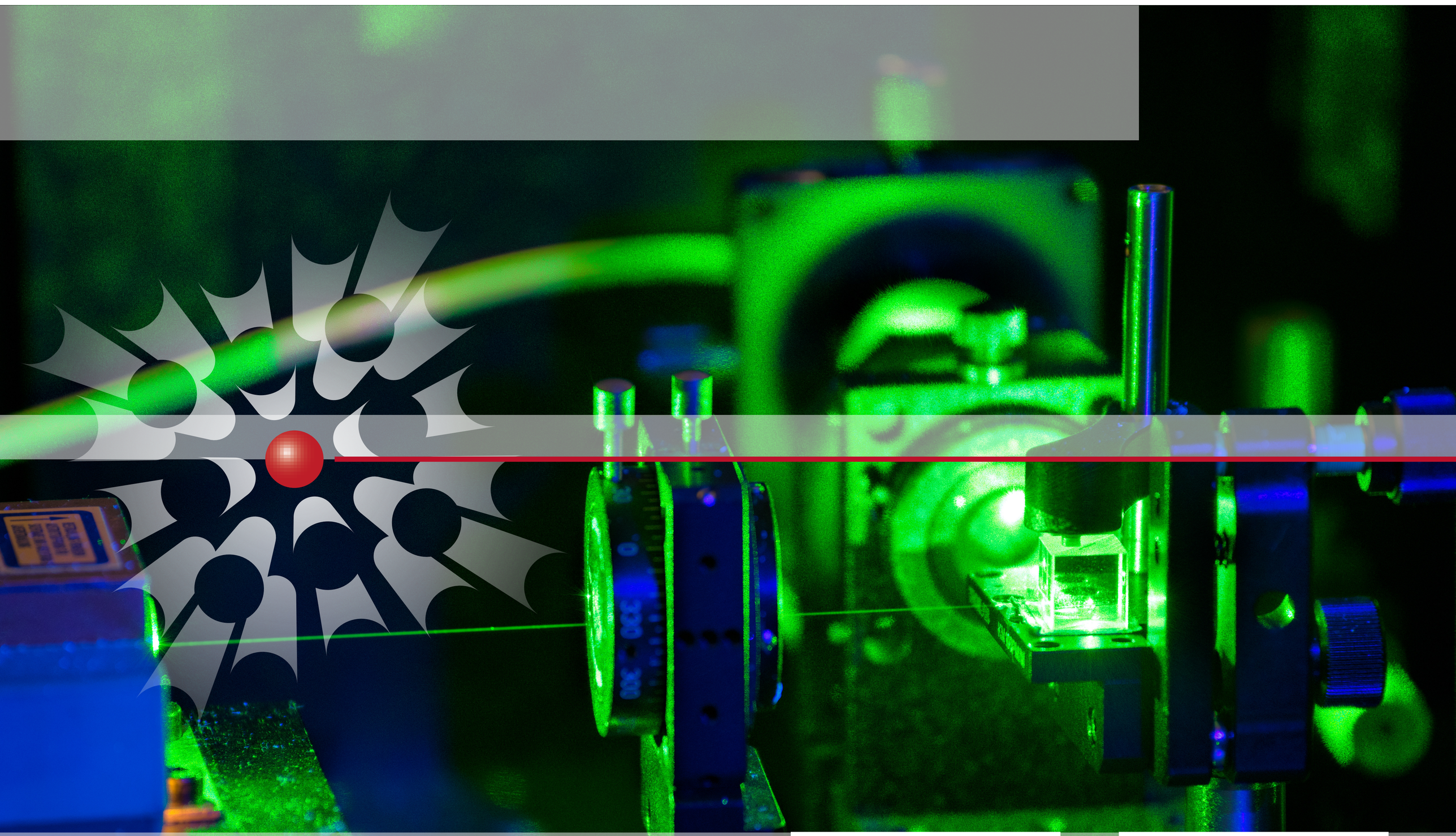
NONLINEAR PHOTONICS

Bachelor and Master theses 2021/22

More information at the Institute of Applied Physics
Workgroup Nonlinear Photonics | Prof. Dr. Cornelia Denz

Wed. 27th October 2021 from 4 pm

Meeting place | Corrensstraße 2/4 | Seminar room 222



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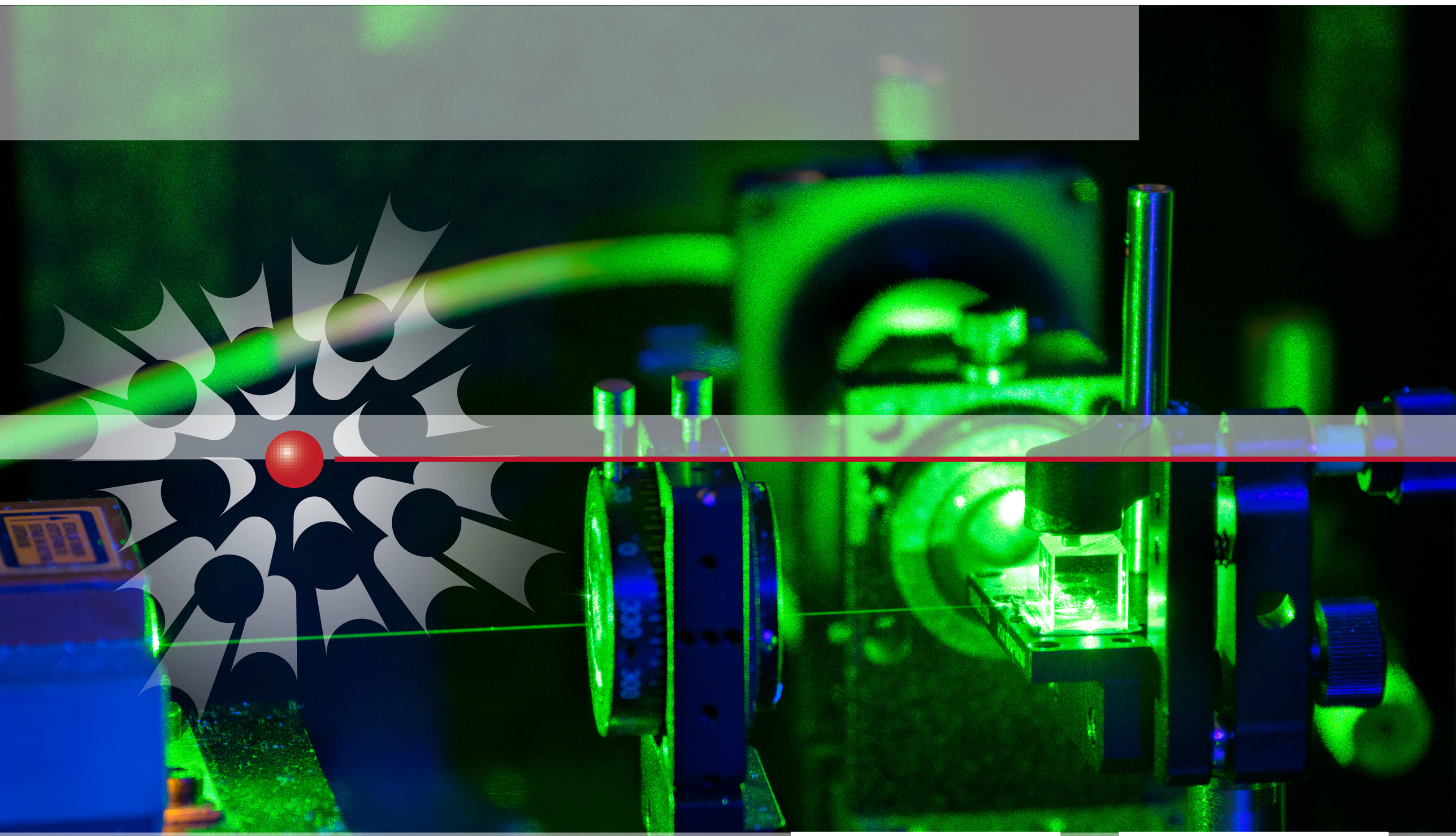
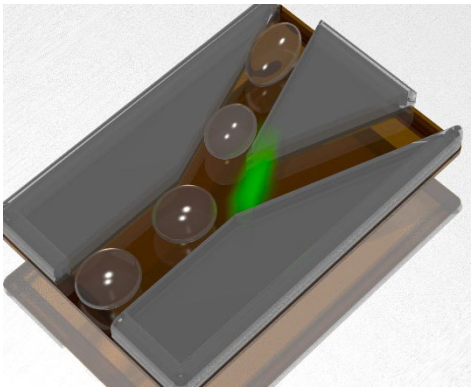


Thesis in the research field Optofluidics

Light-induced dielectrophoresis for droplets manipulation in Lab-On-a-chips

Non-uniform electric fields induce forces on dielectric particles. This phenomen, called dielectrophoresis, can be exploited to manipulate, transport, sort and merge droplets in microfluidic devices, especially in compact, so-called lab-on-a-chip applications. The generation of a strong non-uniform electric field can be achieved by illuminating a photosensitive material, which undergoes a space charge distribtuion depending on the pattern and intesity of the exctitation light. In this way, the electric field can be structured by controlling the light pattern, allowing for the generation of "virtual electrodes". This technique offers a flexible tool for many applications in microfluidics to manipulate femto-liter sizes droplets.



Bachelor and master thesis

Development of microfluidic devices in combination with lithium niobate crystals for light-induced dielectrophoresis manipulation of droplets

The thesis focuses on the development and characterization of a microfluidic device for the generation of oil in water droplets and optically induced dielectrophoretic manipulation. The work includes the fabrication of the microfluidic droplet generator in PDMS using a soft-litography technique in a newly acquired fabrication system, and the characterization of its microfluidic performances. The main point is the experimental study of the most efficient light pattern for the development of the electrode configuration best suited for a selected manipulation structure (e.g. separation, Y-division) of droplets.

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Nonlinear Photonics group

The Nonlinear Photonics group at the Institute of Applied Physics is headed by Prof. Dr. Cornelia Denz. With about 20 members we work in research and education on current problems in the field of optics of complex light fields for applications in nanophotonics, biophotonics and optofluid-ics, quantum optics, nonlinear optics and material production and investigation of optical materials, e.g. also with ultrashort laser pulses. Just contact us if you are interested in one of the fol-lowing topics for your final thesis - whether for a Bachelor or Master thesis.

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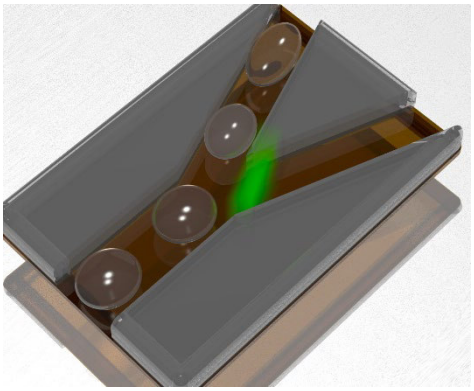

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