



# PADERBORN PHOTONIC LECTURE

WEDNESDAY, 22ND JUNE 2022

## PROF. DR. MARKUS SCHMIDT

UPB | LECTURE HALL A.1 | 15:30 H

### Optical fibers meet nanophotonics: a platform for single-virus sensing, boosting incoupling efficiencies and single-fiber optical trapping

Optical fibers provide a waveguide platform with unique advantages, especially in the fields of bioanalytics and life sciences. In this talk, I will report our recent results on fibers (i) that are interfaced with nanostructures for optical trapping and enhanced coupling efficiencies and (ii) that are used for the detection and characterization of single-nanoobjects through nanoparticle tracking analysis. In detail, I will report on the optical trapping of microspheres and bacteria with only one single-mode fiber by interfacing nanoprinted meta-lenses with single-mode. In addition, I will show that annulus-type high refractive index nanostructures created on the core of an optical fiber allow for boosting incoupling efficiency by orders of magnitude. I will also report on fibers that include longitudinal liquid filled nanochannels, used to characterize the diffusion of biologically-relevant nano-objects such as plasmonic nanospheres, artificial polymer beads, viruses or phages through employing image based tracking and mean-square displacement analysis.



Prof. Dr. Markus Schmidt

(Foto: Daniel Siegesmund)