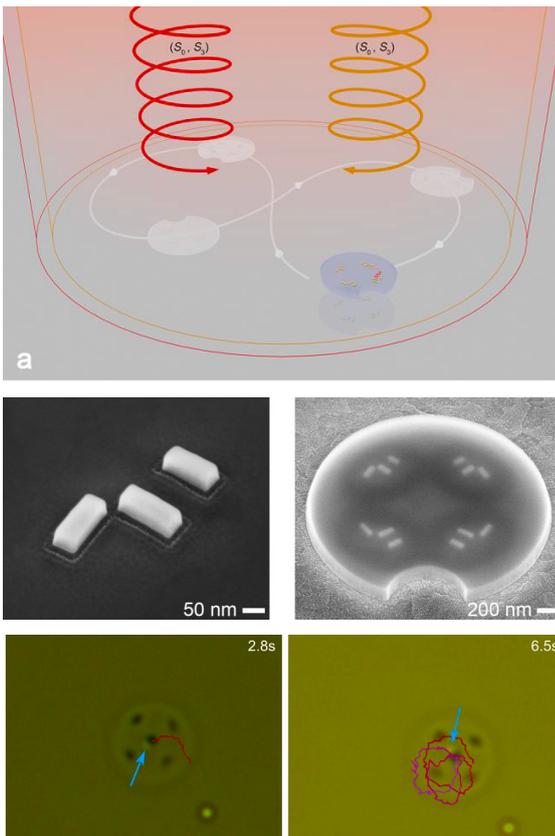


PhD opportunity

“Light-driven microdrones”

Nano-Optics group
Chair of Experimental Physics 5 &
Cluster of Excellence ct.qmat (associate member)

The Nano-Optics group (Chair Experimental physics 5) at the University of Würzburg seeks excellent candidates for a PhD position in the field of Light-driven Micro/Nano-Robotics.



We recently developed light-driven microdrones that can be controlled in all 3 degrees of freedom of 2D motion (forward-backward and left-right translations and clockwise-counterclockwise rotation) independently (X. Wu, R. Ehehalt, G. Razinskas, T. Feichtner, J. Qin, B. Hecht, Light-driven microdrones. Nat. Nanotechnol. 17, 477–484 (2022). <https://doi.org/10.1038/s41565-022-01099-z>). The design involves microdrones equipped with four nanomotors, which are controlled by modulating the power and polarization of two unfocused laser beams of distinct wavelengths, detailed in the Figure to the left.

In this project, we aim to complete the development of light-driven microdrones, achieving comprehensive 3D maneuverability combined with advanced feedback control for nanometer-scale precise motion. The final goal is to employ a microdrone equipped with a resonant gold nanotip to precisely scan the membrane of a living cell within a liquid medium, showcasing the significant potential of microdrones as a robust platform for performing high-precision sensing and manipulation tasks, opening new avenues for innovative experimental research.

The project is a collaboration of our group with IPHT Jena (Dr. Wu). Strong communication skills and proficiency in scientific English are required.

We welcome applicants with backgrounds from physics, applied physics, nanoscience or related fields with relevant experience in experimental work, ideally including published research. Candidates must hold a master’s degree in a qualifying program (equivalent to a German M.Sc. degree). Selected candidates qualify for joining the PhD program at the University of Würzburg or the Graduate School of Science and Technology and will be offered an employment contract (Research Assistant position with social security benefits under German labor law).

How to apply

The application should include a motivation letter, curriculum vitae, transcripts and additional information on relevant experience.

Please send your application to

Prof. Bert Hecht (bert.hecht@uni-wuerzburg.de)

get in touch

