Nano Photon

Lecture

Christopher Gies

Dr. habil. and Head of Quantum Optics
of Semiconductor Nanostructures,
University of Bremen

Friday, 7 May at 15-16 hrs via Zoom

[https://dtudk.zoom.us/j/65303047006?pwd=dWpDMkZUZ3Aya2Era2czbWNxc2dpQT09]

Prospects and limitations of atomically thin semiconductors as laser gain material

About ten years after the discovery of strong optical activity in a layer of atomic thickness, truly two-dimensional transition-metal dichalcogenide (TMD) semiconductors remain the center of research attention of a still growing community [*]. Twistronics is the newest addition to a large zoo of promising methods to tailor macroscopic material properties on the atomic scale: Heterostructures with a well-defined twist angle form a superimposed potential landscape, the control over which gives new ways to enter specific domains of physics, like that of Hubbard systems.

In his talk Christopher Gies will touch on these new research directions and discuss how heterostructures of van der Waals materials sow hope for applications in optoelectronics. A particular focus will be on the gain properties when using TMD monolayers and heterostuctures inside optical microresonators to design a new class of nanolasers.

[*] C. Gies and A. Steinhoff: "*Atomically Thin van der Waals Semiconductors—A Theoretical Perspective*", Laser Photonics Rev. 2021, 2000482.

Christopher Gies is leading the research group Quantum Optics of Semiconductor Nanostructures at the University of Bremen, Germany. His research aims at understanding physical processes on a microscopic level to envision and enable applications in optoelectronics and quantum information technologies using solid-state systems. He has studied and worked at universities in Berlin, Otago (New Zealand), and Bremen, obtaining his M.Sc. degree on ultracold Bose gases, his Ph.D. on quantum dots in microcavities, and his habilitation on semiconductor sources for coherent and quantum light.

The research vision of NanoPhoton - Center for Nanophotonics – is to explore extreme light confinement in a new class of dielectric nanocavities and to use the associated enhanced light-matter interaction to solve fundamental challenges in information and quantum technology.

Danmarks Grundforskningsfond
Danish National Research Foundation

nanophoton.dtu.dk