

Invitation to the PhoenixD Colloquium

Colloquium Chair: Dr. Dietmar Kracht (Task Group S1)
Monday, February 7th, 2022, 10.15 – 12.00 am via Webex
<https://uni-hannover.webex.com/meet/plenum>

"Scalable Laser Synthesis of Colloidal Nanoparticles for Catalysis and Additive Manufacturing"

Prof. Dr.-Ing. Stephan Barcikowski

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Integration of the "nano-function" into products is still limited due to drawbacks of gas-phase and chemical synthesis methods regarding particle aggregation and contamination by adsorbates causing deactivation of the building blocks' surface. In addition, thermodynamically-controlled synthesis methods naturally face limited access to alloy nanoparticle systems with miscibility gaps. As an alternative synthesis route, nanoparticle generation by pulsed laser ablation in liquids has proven its capability to generate ligand-free colloidal nanoparticles with high purity for a variety of materials. Good reproducibility and significant up-scaling of nanoparticle generation were achieved recently by a continuous flow synthesis using a high-power ultrafast laser system leading to productivities of up to 8 g/h colloidal nanoparticles, equivalent to kg/h scale of nano-functionalized micropowders. Such micropowder-supported nanoparticles are feedstock materials for catalysis and additive manufacturing. After presenting the fundamentals and recent progress of laser synthesis, this talk will provide application examples in heterogeneous catalysis (fuel cells, water splitting) as well as additive manufacturing (laser powder bed fusion).

"Optical glass fiber research and development at the LUH HITec"

Dr. Michael Steinke

Institute of Quantum Optics / Hannover Institute of Technology, LUH

Today, optical glass fibers made of fused silica (amorphous SiO₂) are a core technology in fundamental science, digital technologies, and industrial applications. As part of the Hannover Institute of Technology (HITec), we operate two specialty laboratories in ISO7 cleanrooms, which contain state-of-the-art facilities for optical glass fiber fabrication and characterization. In our presentation, we will provide a general introduction into the complex processes used for glass fiber fabrication and our facilities. Furthermore, we will introduce ongoing research activities, which range from novel multicore fibers for biomedical endoscopy to fruitful combinations of glass fiber and nanoparticle technology. As an outlook, we will sketch some broader research ideas, which are promising in the context of integrated optical devices with novel functionalities.