

# nanoSeminar Series 2022

Institute for Materials Science

**Dr. Andreas tittl**

Chair in Hybrid Nanosystems, Nanoinstitute Munich, and Center for NanoScience, Ludwig-Maximilians-University Munich

**Spectrally selective metasurface for strong light-matter coupling and integrated biospectroscopy devices**

Thursday, September 29<sup>nd</sup> 2022  
13:00 – 14:00

Normal: Seminar Room 115, Hallwachsstr. 3 (HAL)

Pandemic version: <https://tinyurl.com/nanoSeminar-GA>

Metasurfaces composed of sub-wavelength dielectric resonators are a powerful platform for controlling light on the nanoscale, providing significant advantages over their plasmonic counterparts. Combining them with the emerging physical concept of bound states in the continuum (BICs) has enabled the realization of high-Q metasurfaces with unprecedented spectral control over the nanophotonic enhancement. In my talk, I will introduce several examples of such spectrally selective metasurfaces and show how they can be used to realize new approaches for enhancing light/matter interactions. Specifically, I will focus on two recent projects spanning the gamut from fundamental physics to practical applications: (1) the realization and precise control of polaritonic strong coupling in monolithic BIC-based metasurfaces constructed solely from nanostructured transition metal dichalcogenides (TMDCs), and (2) the use of spectrally selective nanophotonic systems for the development of compact biospectroscopy devices with a vision towards point-of-care diagnostics.

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Andreas Tittl holds a position as Emmy Noether Research Group Leader at LMU Munich, Germany, where he focuses on the design and experimental realization of novel metasurface-based concepts for enhanced light/matter interaction, ultrasensitive biodetection, and nanoscale light manipulation. He received his Ph.D. in physics from the University of Stuttgart, Germany, in 2015, working on nanophotonic sensors for the detection of gases and catalytic reactions. As postdoctoral researcher and Marie-Curie-funded EPFL Fellow at Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, he developed surface-enhanced plasmonic sensor approaches for understanding complex biological systems and has pioneered the use of dielectric metasurfaces in biochemical spectroscopy.