



# Seminarankündigung

**Dienstag, 17. April 2018**

**13:00 Uhr**

**WSI, Seminarraum S 101**

## **“Rocking at the nanoscale: Controlling and probing optically active nanosystems by nanoquakes on a chip”**

Over the past more than 20 years, surface acoustic waves (SAWs) have been applied to probe and manipulate charge, spin, magnetic and optical excitations in condensed matter, in particular semiconductor heterostructures. In this field of fundamental and applied research, these “nanoquakes on a chip” provide a particularly useful and versatile tool for massively parallel addressing a broad variety of nanosystems at radio frequencies via strong acousto-mechanical and acousto-electric couplings.

In my talk, I highlight our recent advances in the control and probing of fundamental physical properties in electrically and optically active hybrid nanosystems. First, I will discuss the contact-free measurement of photoconductivity in monolayer MoS<sub>2</sub>, the archetypical direct bandgap two-dimensional semiconductor directly grown on LiNbO<sub>3</sub> [1]. Second, I will demonstrate that the dynamic acoustic field of a SAW modulates the sharp optical transition of a quantum dot and that the underlying sound-matter coupling allows for pressure sensing on the nanoscale [2-4].

[1] E. Preciado, F. J. R. Schülein, A. E. Nguyen, D. Barroso, M. Isarraraz, G. von Son, I-H. Lu, W. Michailow, B. Möller, V. Klee, J. Mann, A. Wixforth, L. Bartels, H. J. Krenner, *Nature Commun.* 6, 8953 (2015)

[2] F. J. R. Schülein, E. Zallo, P. Atkinson, O. G. Schmidt, R. Trotta, A. Rastelli, A. Wixforth, H. J. Krenner, *Nature Nanotechnol.* 10, 512 (2015).

[3] E. D. S. Nysten, Y. H. Huo, H. Yu, G. F. Gong, A. Rastelli, H. J. Krenner, *J. Phys. D: Appl. Phys.* 50, 43LT01 (2017).

[4] M. Weiß, A. L. Hörner, E. Zallo, P. Atkinson, A. Rastelli, O. G. Schmidt, A. Wixforth, H. J. Krenner, *Phys. Rev. Applied* 9, 014004 (2018).

**Prof. Dr. Hubert J. Krenner**  
**Universität Augsburg**  
**Germany**