

Physikalisches Kolloquium
Einladung**Physics Colloquium**
Invitation**Monday, 20 October 2025**

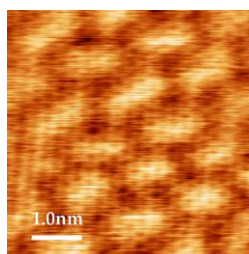
Lecture Hall N24/H13, at 16:15

Coffee and cookies will be served in front of the lecture hall from 16:00

**Recent innovations in AFM precision and metrology:
Enabling ultra-high resolution in ambient****Prof. Dr. Peter Schön,**
Oxford Instruments GmbH, Germany<https://afm.oxinst.com/>

A next generation atomic force microscope will be discussed that uses a patented Quadrature Phase Differential Interferometry (QPDI) detection system to precisely and accurately measure true tip displacement. This innovation challenges the AFM status quo with significant improvements in accuracy, precision, sensitivity, and repeatability.

Further, the use of higher eigenmodes imaging (HEMI) provides a routine approach to achieving molecular, and in some instances submolecular resolution, on a wide range of soft matter samples. Ultra-high resolution imaging can be routinely achieved in *ambient* conditions through combining both the ultra-low noise floor and versatility of excitation options on Cypher family AFMs with the low-amplitude (≤ 1 nm) excitation of higher eigenmodes of a cantilever. Submolecular or ultra-high resolutions imaging in the ambient paves the way for unambiguous chemical identification of molecular species. Thus, enabling a new exciting area of molecular analytics.



High-resolution AFM image of a polythiophene (PT) film on hexagonal boron nitride (hBN), measured under ambient conditions

References

1. Small Methods. 2025 Jul;9(7): e2401918. doi: 10.1002/smt.202401918.
2. Nature Communications (2019) 10:1537 | <https://doi.org/10.1038/s41467-019-09571-6>

Host: Prof. Dr. Kay Gottschalk, Institute of Experimental Physics

Organisation: Prof. Dr. Jens Michaelis, Institute of Biophysics, jens.michaelis@uni-ulm.de, +49-731-50-23050