



Physikalisches Kolloquium

Dr. Thomas Juffmann

University of Vienna

Enhancing the sensitivity of phase microscopy

Optical phase contrast microscopy and cryo-electron microscopy are widely used in the study of cells and proteins, respectively. In both techniques, a specimen imparts a phase shift on the probe (photons or electrons), which can be measured using various interferometric techniques.

In this talk I will briefly discuss the physical basics and limits of phase microscopy, and will show ways how to improve on current techniques using wave-front shaping, cavity or quantum enhanced measurements. I will demonstrate how wave-front shaping can enable phase contrast imaging with optimized sensitivity, and how multi-passing the probe particles through a sample can be used for high sensitivity / low damage imaging. The latter could potentially allow for cryo-electron microscopy with unprecedented resolution .

Finally, I will discuss how one of the techniques we developed can be used for gating images on the nanosecond scale, which enables video-rate fluorescence lifetime imaging with single molecule sensitivity.

Monday, December 6, 2021, 4:15 p.m.

H4