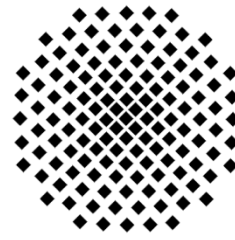


# Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart  
Max-Planck-Institut für Festkörperforschung  
Max-Planck-Institut für Intelligente Systeme

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**Dienstag, 14. Dezember 2021**

**16:15 Uhr**

**ONLINE**

**Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen**

Gastgeber: Prof. Dr. Harald Gießen, Universität Stuttgart, Telefon: 0711 - 685-65111

## Ultrafast Electron Microscopy

**Claus Ropers**  
*Universität Göttingen*

### Abstract

Time-resolved electron imaging yields insights to ultrafast phenomena in materials with a sensitivity to structural, electronic and magnetic degrees of freedom. A particularly versatile method is Ultrafast Transmission Electron Microscopy (UTEM), which combines the high spatial resolution of electron microscopy with the temporal resolution of optical spectroscopy. Moreover, UTEM provides for a unique test bench to study quantum optics phenomena with free electrons.

This talk will introduce the implementation of UTEM with field emitter sources, which offer ultrashort electron pulses of exceptional beam quality. Examples of structural and magnetization dynamics probed by UTEM will be discussed. Moreover, the mechanisms involved in electron beams interacting with nanoscale optical fields will be described, emphasizing quantum effects and the transverse and longitudinal manipulation of the free-electron wave function.