WWU MÜNSTER

FACHBEREICH PHYSIK

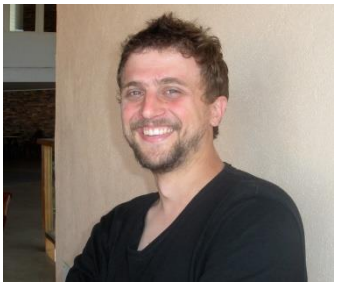
›Allgemeines Physikalisches Kolloquium

> Donnerstag, 25.04.2019 um 16 Uhr c.t.

Dr. Florent Houdellier*

Giuseppe M. Caruso and Arnaud Arbouet*

***CEMES-CNRS, Université de Toulouse**



Ultrafast Transmission Electron Microscopy: Historical Development, Instrumentation and Applications

X-ray photons and electrons are routinely used to investigate materials at the nanoscale. Whereas phase information can be retrieved in coherent diffractive imaging experiments performed with the coherent X-ray beams provided by Free Electron Lasers, Transmission Electron Microscopy is undoubtedly the most versatile and widespread technique giving access to real space imaging with nanometer spatial resolution. By enabling a direct visualization of materials down to the atomic scale, Transmission Electron Microscopes (TEM) have allowed giant steps in chemistry, biology or physics. Images, either in real or reciprocal space, as well as electron energy loss spectra (EELS) can be obtained and combined from nanoscale regions of a sample yielding structural and chemical informations with unrivalled spatial resolution. Many of these achievements were nourished by key instrumental developments such as aberration correctors, high brightness sources, detectors, … . Despite spectacular advances, investigations using TEM have long been restricted to systems either static or evolving on timescales compatible with the frame rate of CCD cameras. Yet, the observation of a physical system as it evolves in real time is essential to the understanding of its dynamics.

Time-resolved Transmission Electron Microscopy (TR-TEM) aims at overcoming this limitation and exploring the dynamics of nanoscale systems. Since the pioneering work of the group of O. Bostanjoglo, spectacular progress has been made to provide time-resolved TEM with a constantly improving spatio-temporal resolution allowing to observe samples at the femtosecond timescale and sub-nanometre spatial resolution. During my talk, I would like to present a brief introduction to the field of time-resolved TEM, describe the major instrumental developments, and give examples of applications in different fields. In the last part, I will show the unique TR-TEM instrument developed in our Laboratory allowing to perform femtosecond electron holography and present our future projects.

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Kolloquiums-Kaffee
ab 16 Uhr vor dem Hörsaal

Wilhelm-Klemm-Straße 10
Institutsgruppe 1 Hörsaal HS 2

Kolloquiums-Kaffee
ab 16 Uhr vor dem Hörsaal

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