chemisch physikalische gesellschaft

Gegründet im Jahre 1869 von H. Hlasiwetz, J. Loschmidt, J. Petzval und J. Stefan

EINLADUNG

zum Vortrag von

Dr. Michael Leitner

Technische Universität München, Physik Department und Heinz Maier-Leibnitz Zentrum, Garching, Deutschland

Atomic Diffusion studied by Coherent X-ray Scattering

am
Dienstag, 20. November 2018, um 17:30 Uhr

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmanngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmanngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract

Diffusion in condensed matter is fundamental to aspects as diverse as phase transitions, corrosion, high-temperature materials stability, or ionic conduction. While diffusion on the macroscopic scale is completely specified via the partial differential diffusion equation by how the diffusion constant depends on, e.g., composition and temperature, a direct understanding of the processes at work can only be achieved in terms of an atomic-scale picture.

In this talk I will introduce atomic-scale X-ray photon correlation spectroscopy, a synchrotron-based experimental method that allows us to follow the atoms on their microscopic random walk, composed of discrete jumps on timescales of seconds to hours. I will review the theoretical concepts and discuss the relations to alternative atomically-resolved methods. Further, I will give an overview on our results in crystalline and amorphous matter, comprising metals, semiconductors and insulators. Apart from jump vectors and frequencies in equilibrium diffusion, I will present also our interpretation of the recent findings of beam-induced dynamics, where in specific systems the absorption of hard X-ray photons leads to athermal atomic motion.