

Physikalisches Kolloquium
Einladung**Physics Colloquium**
Invitation**Monday, 19 January 2026**

Lecture Hall N24/H13, at 16:15 hrs

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

Seeing atoms and electrons in space and time**Prof. Dr. Peter Baum**

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All processes in materials, nanostructures and devices are on a fundamental level defined by electronic and atomic motion from initial to final conformations. Our approach for a direct, real-space visualization is pump-probe electron microscopy and diffraction with single-electron wavepackets under the control of laser light [1]. The resulting few-femtosecond and attosecond time resolution allows to see almost any light-matter interaction or structural dynamics on fundamental scales in space and time [2-5]. We report selected results on strongly correlated materials [2], electronic circuitry [3], rotational phonons [4], free-electron quantum phenomena [5] and attosecond dynamics in nanomaterials [6].

- [1] C. Kealhofer, W. Schneider, D. Ehberger, A. Ryabov, F. Krausz, P. Baum, *Science* 352, 429 (2016).
- [2] P. Baum, D.-S. Yang, A. H. Zewail, *Science* 318, 788 (2007).
- [3] A. Ryabov and P. Baum, *Science* 353, 374 (2016).
- [4] S. R. Tauchert, M. Volkov, D. Ehberger, D. Kazenwadel, M. Evers, H. Lange, A. Donges, A. Book, W. Kreuzpaintner, U. Nowak, P. Baum, *Nature* 602, 73 (2022).
- [5] Y. Fang, J. Kuttruff, D. Nabben, P. Baum, *Science* 385, 183-187 (2024).
- [6] D. Nabben, J. Kuttruff, L. Stolz, A. Ryabov, P. Baum, *Nature* 619, 63 (2023).

