



› Allgemeines Physikalisches Kolloquium

› **Donnerstag, 19.01.2017 um 16 Uhr c.t.**

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Ultrafast terahertz spectroscopy: probing and controlling fundamental motions of electrons, spins and ions

The terahertz (THz) frequency range is attracting increasing interest for both applied and fundamental reasons. On one hand, bit rates in current information technology may soon approach the THz range. Therefore, it is warranted to study the behavior of materials at THz frequencies. This goal is also highly interesting from a scientific viewpoint because its low photon energy (4.1 meV at 1 THz) makes THz radiation an excellent probe of many elementary excitations of solids, for instance lattice vibrations (phonons), conduction electrons, excitons and spin waves.

This talk is supposed to provide an introduction to THz spectroscopy of solids. It will show how ultrashort THz electromagnetic pulses (duration $\ll 1$ ps) are used as ultrafast Ohmmeters and Amperemeters to gain insight into elementary motions of electrons and spins and their coupling to the crystal lattice. Part of these results has paved the way to a new class of broadband THz radiation sources. Finally, examples are provided to demonstrate that extremely strong THz fields (\sim MV/cm) can even be used to push matter into novel states.