

**Plenary Talk** PV XII Wed 8:30 HSZ 01  
**Structural dynamics of condensed matter mapped by femtosecond infrared and x-ray probes** — ●THOMAS ELSAESSER —  
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The study of ultrafast structural dynamics in condensed matter has developed into an exciting area of modern physics. Presently, there are strong efforts to unravel transient structures on atomic length and femtosecond time scales in order to understand the microscopic interactions governing phase transitions, chemical reactions and other structural changes. Powerful experimental techniques such as multidimensional nonlinear spectroscopies in a wide spectral range and femtosecond x-ray diffraction have been developed to observe such phenomena in real-time. This talk gives an overview of recent work on ultrafast structural dynamics in condensed matter. After a brief introduction into two-dimensional (2D) vibrational spectroscopy and femtosecond x-ray diffraction with table-top laser sources, recent results on structural dynamics of hydrogen-bonded systems will be presented. 2D infrared spectroscopy gives insight into structural fluctuations and interactions in liquid water and hydrated biomolecules while chemical processes in hydrogen bonded ionic crystals are mapped by femtosecond x-ray powder diffraction.