

## LECTURE

# Ultrafast modulation of electronic structure by coherent phonon excitations

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Moderator	Andreas Borgschulte
Audience	Scientists interested in spectroscopy
Date	08.12.2016, 15:00
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**Abstract**

Soft x-ray absorption spectroscopy has developed into a standard method for analyzing chemical binding, symmetry properties and structure of materials in an element-specific way. Presently, there are strong efforts to implement time-resolved x-ray absorption in the femtosecond time range in order to address structural dynamics connected with electron rearrangements and/or nuclear motions. Here, we report on a novel pump-probe approach in which photo-induced structural dynamics are monitored by femtosecond extreme ultraviolet pulses from a laser-driven high-harmonic source. The hydrogen storage material lithium borohydride ( $\text{LiBH}_4$ ) is studied as a model system. An intense optical pulse at 800 nm, far below the bandgap of the material, induces both a relocation of electronic charge and - via a Raman process - coherent phonon motions in the crystal lattice. The latter are mapped by absorption changes in the range of the Li K-edge. We observe pronounced changes of x-ray absorption in the XANES region above the K-edge and will discuss their time evolution and the physical mechanisms behind them.

The language of the presentation is English  
Free entrance, guests are welcome