## Coherent phonons in condensed matter

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The impulsive excitation of coherent lattice vibrations with ultrashort laser pulses in a wide variety of materials allows to gain insight into nonlinear light-electronphonon interaction on a femtosecond time scale. I will discuss the generation of coherent optical and acoustic phonons in semiconductors and semiconductor heterostructures with respect to different driving forces and how they can be distinguished. Especially in semiconductor superlattice zone folded acoustic phonons can be selectively excited by multiple pulses via an impulsive stimulated Raman process. In the same system optical phonons are coherently excited via coupling to coherent electronic wavepackets (Bloch oscillations). Finally I will present the excitation of coherent phonons in  $VO_2$  and their relevance for ultrafast optically induced isolator-to-metal transitions.