

Ultrafast changes in lattice symmetry probed by coherent phonons in VO₂

Monday 4 April 2011 15:30 (20 minutes)

The effect of an ultrafast change in crystal symmetry on the coherent response of the lattice is investigated using the photoinduced semiconductor-metal phase transition in VO₂. Below the photoinduced phase transition threshold, the four lowest Ag phonon modes of the monoclinic phase modulate the transient reflectivity. As the pump intensity is increased, a photoinduced phase transition occurs resulting in a prompt change in the phonon dynamics. These measurements observe lattice dynamics on a timescale previously inaccessible to current lattice probes and show that the photoinduced phase transition is driven by excited electrons changing the lattice potential symmetry.

Author: WALL, Simon (Fritz Haber Institute)

Co-authors: WEGKAMP, Daniel (Fritz Haber Institute); STAHLER, Julia (Fritz Haber Institute); FOGLIA, Laura (Fritz Haber Institute); WOLF, Martin (Fritz Haber Institute); HAGLUND, Richard (Vanderbilt University)

Presenter: WALL, Simon (Fritz Haber Institute)

Session Classification: Electrons and phonons