

Advances in nonlinear phononics

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In this talk, I will discuss how intense electromagnetic radiation at TeraHertz frequencies can be used to coherently rearrange atoms within the crystal lattice of a solid.

I will report on a number of recent experiments in which such coherent modulation has been used to induce a mysterious non-equilibrium superconducting state at temperatures far in excess of the thermodynamic transition point T_c . These experiments are now combined with external fields like Pressure or Magnetic fields, providing a new tuning knob to understand the difficult physics at hand.

I will also discuss how phononics can be applied to ferroelectrics and magnetic materials, controlling and measuring ferroelectric and magnetic orders.