

Nonlinear Polaritonics in Quantum Materials

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Abstract

I will discuss how coherent electromagnetic radiation at Tera-Hertz and mid-infrared frequencies can be used to manipulate complex solids. As collective excitations are driven coherently and nonlinearly, virtually uncoupled normal modes of the material are made to interact. Hence, these drives give rise to non-thermal states with unconventional properties, and sometimes with emergent order under a drive. Interesting examples involve the nonlinear control of the crystal lattice, used to induce magnetic order, ferroelectricity and non-equilibrium superconductivity at high temperatures.