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【168】 Phase transition driven by ultrashort laser pulses in the charge-density-wave material $K_{0.3}MoO_3$

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Blue Bronze ($K_{0.3}MoO_3$) is a quasi 1D material exhibiting a charge density wave with a periodic lattice distortion (PLD). In a time resolved x-ray experiment at SwissFEL, we study the dynamics of the PLD by pumping $K_{0.3}MoO_3$ with short laser pulses and probing it using x-ray diffraction. We construct reciprocal space maps (RSM) of superlattice reflections at different delays. The RSM along the surface normal gets broader at the delay equal to half the amplitude mode oscillation period, indicating a transient inversion of the PLD. For longer delays, this broadening is not visible. However, the diffracted x-ray intensity drops below the unpumped value indicating a molten CDW near the surface.

Theoretical Work

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