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【633】 Electronic and magnetic tuning of charge order and phonon anomaly in a cuprate spin ladder

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Charge order (CO) and the connection to electron-phonon coupling (EPC) play crucial role in the low-energy regime of quasi-one-dimensional ladder materials. Characterizing the relevant excitations provides a direct tool to assess the underlying complex interactions. Resonant inelastic X-ray scattering (RIXS) is a powerful technique for probing phonons and its interplay with CO. We investigated the CO and optical phonon excitations in the two-leg ladder subsystem of $\text{Sr}_{14}(\text{Cu},\text{Co})_{24}\text{O}_{41}$ using O K-edge RIXS and X-ray absorption spectroscopy (XAS). We infer a continuous shift of the CDW ordering towards Γ -point with Co doping, with a 5-10 meV softening of the bond-stretching phonon mode (~ 65 meV) at the ordering vector. This is accompanied by a reduction in the ladder hole density determined from XAS.

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