Driving Coherent Phonon-Phonon Angular Momentum Transfer via Lattice Anharmonicity

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I will introduce the basics of THz-driven lattice trajectory control for IR- and Raman-active modes, and extend it by tailored THz helicity states to establish helical or chiral nonlinear phononics. By this, we coherently control angular momentum transfer between two lattice modes by the inverse process of anharmonic decay abundant in nature. The observed rotational phonon-phonon Umklapp scattering enforces the conservation of quantized crystal angular momentum, as dictated by the crystal's discrete rotational symmetry. [see also *arXiv:*2503.11626]