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Title: Anharmonic vibrational polaritons beyond the long wavelength approximation

Abstract: In this talk, we investigate anharmonic vibrational polaritons formed due to strong light-matter interactions in an optical cavity between radiation modes and anharmonic vibrations beyond the long-wavelength limit. We introduce a conceptually simple description of light-matter interactions, where spatially localized cavity radiation modes couple to localized vibrations. Within this theoretical framework, we employ self-consistent phonon theory and vibrational dynamical mean-field theory to efficiently simulate momentum-resolved vibrational-polariton spectra, including effects of anharmonicity. Numerical simulations in model systems demonstrate the accuracy and applicability of our approach.