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Coherent control of sub-terahertz confined acoustic nanowaves: Theory and experiments Source

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Abstract

Recently it has been theoretically proposed that phonons could be used to store and process information. We report coherent control experiments on acoustic-phonon nanocavities in the sub-THz range and discuss the feasibility of using this system as a phononic memory. The nanocavities provide localized and monochromatic waves, two essential characteristics to work as memories and actuators. A writing-erasing-reading procedure based on the coherent generation, control, and detection of acoustic phonons using ultrashort light pulses is presented. The results are in agreement with numerical simulations using an implementation of a photoelastic model. Our results open the way to the practical realization of complex nano-optomechanical devices.