

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Phonon down-conversion in a linear ion trap SHIQIAN DING, GLEB MASLENNIKOV, ROLAND HABLUTZEL, HUANQIAN LOH, DZMITRY MATSUKEVICH, Centre for Quantum Technologies, National University of Singapore — Ions confined in a Paul trap are well isolated from the environment and their motion in the trap is usually well approximated by a set of normal modes. However, Coulomb interaction between trapped ions is nonlinear and can introduce coupling between the normal modes of motion. We report our experimental work on coherent coupling between axial and radial modes of motion in the ion crystal formed by two Yb⁺ ions. We show that under the resonant conditions one phonon in the axial motional mode of the ion crystal can be down-converted into two phonons in the radial mode of motion.

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Date submitted: 30 Jan 2015

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