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Non-equilibrium dynamics of isolated trapped ion chain ZHEXUAN GONG, LUMING DUAN, Department of Physics, University of Michigan — We have studied the dynamics of an isolated trapped ion chain under a non-equilibrium initial state in both motional and internal degrees of freedom. For motional state, we find that the dynamics of temperature distribution is qualitatively different between axial and transverse direction, due to distinctive sound wave propagation. For internal state, we show that by engineering the effective Hamiltonian through laser field, we can get a variety of spin wave dynamics based on the range of effective spin-spin interaction. We also show that these interesting non-equilibrium dynamics can be readily tested with current ion-trap technology.

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