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Investigating Transport Phenomena with Trapped Ion Strings THANED PRUTTIVARASIN, MICHAEL RAMM, AXEL KREUTER, HARTMUT HAEFFNER, UC Berkeley — Trapped laser-cooled ion crystals are well controllable coulomb coupled oscillators that present an ideal experimental setting for a variety of quantum simulations. We study the energy transfer dynamics within long ion chains when one end of the crystal is heated strongly by a thermal bath of variable temperature. The bath can be engineered using focused laser beam with variable detuning of the S1/2-P1/2-Doppler cooling transition of 40Ca+. The local temperature of the chain can be probed by monitoring the fluorescence of another focused laser beam. We report on the experimental progress towards this scheme and give a brief outlook for further experiments that involve a superimposed optical lattice and aiming at observing a quantum phase transition associated with the additional optical potential. In particular, we plan to investigate the heating and cooling dynamics within crystals of several tens of 40Ca+ ions.

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