Landau Damping as a General Description of Dissipation: Caldeira-Leggett and Vlasov-Poisson GEORGE HAGSTROM, New York University, PHILIP MORRISON, University of Texas at Austin — The Caldeira-Leggett Hamiltonian describes the interaction of a discrete harmonic oscillator with a continuous bath of harmonic oscillators. This system is a standard model of dissipation in macroscopic low temperature physics, and has applications to superconductors, quantum computing, and macroscopic quantum tunneling. The similarities between the Caldeira-Leggett model and the linearized Vlasov-Poisson equation are analyzed, and it is shown that the damping in the Caldeira-Leggett model is analogous to that of Landau damping in plasmas. An invertible linear transformation is presented that converts solutions of the Caldeira-Leggett model into solutions of the linearized Vlasov-Poisson system. The idea that general dissipative systems can be described in this way is explored.

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