Abstract Submitted
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Transient Heat Conduction in Strongly Correlated Systems[1] RITA AGHJAYAN, ARTHUR LUNIEWSKI, KAMIL WALCZAK, Department of Chemistry and Physical Sciences, Pace University, 1 Pace Plaza, New York, NY 10038, NANOSCALE PHYSICS DIVISION TEAM — We analyze heat transport carried by electrons via quantum dots, modeled as strongly-correlated systems with discrete spectrum of available energy levels, which couple to two heat reservoirs of different temperatures. Our computational method for the electronic heat flux is based on the density matrix formalism, while the transition rates between particular quantum states are determined within the Fermi's golden rule. By taking into consideration the non-steady-state solutions for probabilities, we examine the influence of initial conductions and contact-induced time delays onto the rapid thermal switching response of the quantum system under investigation. Specifically, we use several different models for quantum dot, where the Zeeman splitting, Coulomb blockade, and the concept of dark-state are explicitly included. A special attention is devoted to thermal memory effects and the relationship between all the quantum transport expressions and the hyperbolic Cattaneo-Vernotte equation.

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