Abstract Submitted
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Nonlinear thermoelectric behavior in double-barrier quantum-dots[1] ERIC HOFFMANN, NATTHAPON NAKPATHOMKUN, University of Oregon, HENRIK NILSSON, Lund University, ANN PERSSON, University of Oregon, LARS SAMUELSON, Lund University, HEINER LINKE, University of Oregon — Thermovoltage in bulk material systems is to good approximation linear in applied temperature difference, ΔT, with the constant of proportionality being the thermopower, S. However, this linear relationship does not necessarily hold true for nanoscale thermoelectrics[1]. Here we report on basic research which uses a single quantum dot as an example nanoscale system for studying nonlinear thermoelectric phenomena. Specifically, we show experimentally as well as theoretically that strong modulations in the transmission function of the quantum dot manifests into thermovoltages and thermocurrents which are not linear in ΔT at ΔT as small as $\Delta T/T = 0.1$. Quantum-dot thermometry[2] has been used to measure ΔT. Understanding these nonlinearities is important for the development of thermoelectric materials that aim to exploit quantum phenomena. 1. J.M. Wang *et al*, *Nonlinear thermoelectric transport through a double barrier structure*, Mod. Phys. Lett. B, **20**, 215-223 (2006). 2. Hoffmann, E.A. *et al*, *Quantum-dot thermometry*, Appl. Phys. Lett. **91**(25), 252114 (2007)

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