Abstract Submitted
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Thermoelectricity in the ultra-thin limit[1] JAYAKANTH RAVICHANDRAN, PIM ROSSEN, VINCENT WU, University of California, Berkeley, ARUN MAJUMDAR, Department of Energy, R. RAMESH, University of California, Berkeley — Hicks and Dresselhaus [1] predicted an enhanced thermoelectric power factor due to quantum confinement. In the past, superlattices have been employed to demonstrate this effect but the results have remained controversial. Sustained efforts on surface termination and treatment of single crystalline oxide substrates has enabled growth of high quality thin films using techniques like pulsed laser deposition and molecular beam epitaxy. In this work, we explore the nature of thermoelectric response for ultra thin layers ($\sim$ 1 – 100 nm) of model thermoelectric oxides such as doped $SrTiO_3$ and $Bi_2Sr_2Co_2O_y$grown by pulsed laser deposition. Thermopower, resistivity and Hall measurements were carried out as a function of thickness to understand the role of quantum confinement and other extraneous effects like surface depletion etc. on the thermoelectric response. References: [1] L.D. Hicks and M. S. Dresselhaus, Phys. Rev. B, 47, 12727 (1993).

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Jayakanth Ravichandran
University of California, Berkeley

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