Abstract Submitted
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Thermal transport across perovskite superlattices[1] JAYAKANTH RAVICHANDRAN, AJAY YADAV, University of California, Berkeley, RAMEZ CHEAITO, University of Virginia, Charlottesville, PIM ROSSEN, University of California, Berkeley, SIRIYARA SURESHA, Lawrence Berkeley National Lab, Berkeley, PATRICK HOPKINS, University of Virginia, Charlottesville, ARUN MAJUMDAR, Department of Energy, RAMAMOORTHY RAMESH, University of California, Berkeley — Understanding thermal transport across interfaces is useful for designing materials for thermal management, thermoelectricity etc. Despite years of investigation, there are several open questions on the nature of thermal transport across solid-solid interfaces. The ability to control materials synthesis down to a monolayer has enabled study of interface phonon scattering in systems such as superlattices, heterostructures etc. We chose perovskite oxides, which are excellent thermoelectric materials, as model systems to study interfacial thermal transport. Superlattices of $SrTiO_3$, $CaTiO_3$ and $CaMnO_3$, with period thicknesses ranging from 1-176 monolayers were grown using pulsed laser deposition, monitored by in-situ RHEED. We measured temperature dependent (100 - 400 K) cross plane thermal conductivity of these superlattices using the time domain thermoreflectance (TDTR). The lowest thermal conductivity measured is below the alloy limit at room temperature. The period thickness dependent thermal conductivity shows signs of zone folding for short period superlattices.

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