Room-Temperature Voltage Tunable Phonon Thermal Conductivity via Reconfigurable Interfaces in Ferroelectric Thin Films

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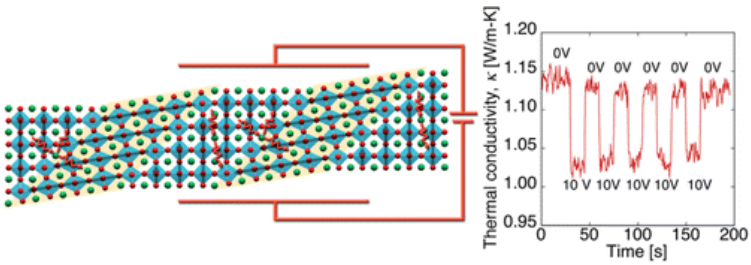

Dynamic control of thermal transport in solid-state systems is a transformative capability with the promise to propel technologies including phononic logic, thermal management, and energy harvesting. A solid-state solution to rapidly manipulate phonons has escaped the scientific community. We demonstrate active and reversible tuning of thermal conductivity by manipulating the nanoscale ferroelastic domain structure of a $Pb(Zr_{0.3}Ti_{0.7})O_3$ film with applied electric fields. With subsecond response times, the room-temperature thermal conductivity was modulated by 11%.