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**Thermoelectric effect due to coupled flow of electrons and phonons: a Landauer approach** LUTFE SIDDIQUI, SUPRIYO DATTA, School of Electrical and Computer Engineering, Purdue University — Performance of thermoelectric materials are determined by what is known as the thermoelectric figure of merit $ZT = S^2GT/K$, where $S$ is the Seebeck coefficient, $G$ is the electronic conductance, and $K$ is the thermal conductance. In order to compete with conventional generators and coolers the thermoelectric devices need to use materials that has a $ZT > 3$. Yet the materials that have been employed in thermoelectric devices so far have not shown a $ZT$ value greater than 1. Current research direction involves tailoring the electronic and phonon transport properties using nanostructured materials and also using coupled flow of electrons and phonons, namely, phonon drag to improve Seebeck coefficient. Consequently, a theoretical model that treats electrons and phonons in the common framework can, in the least, assist creative use of these different electronic and phonon transport engineering approaches. With this in mind we present a unified model based on Landauer approach that treats electrons and phonons on an equal footing irrespective of whether the flows are coupled or decoupled.

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