Abstract type: Oral

Topic: Electron Phonon Coupling and Thermoelectricity

Title: Optimal thermoelectric figure of merit of SiGe core-shell nanowires.

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Summary:

We investigate the thermoelectric energy conversion efficiency of Si and Ge nanowires. In particular, we consider Si/Ge core-shell nanowires. We show how the presence of a thin Ge shell in a Si core nano-wire increases the overall figure of merit. We find the optimal thickness of the Ge shell in terms of providing the largest figure-of-merit of the devices. We consider also Ge core/Si shell nanowires and we show that there is not an optimal thickness of the shell, since the figure-of-merit is a monotonously decreasing function of the radius of the nano-wire. Finally, we verify the empirical law that relates the electron energy gap to the optimal working temperature, the one maximising the efficiency of the device.