MAR15-2014-020344

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

Interfacial Heat Conduction in Modern Semiconductor Nanostructures

KENNETH GOODSON, Stanford University

Heat conduction through interfaces in electronic nanostructures grows more important with the dimensional scaling trends throughout the semiconductor industry. The complexity of interfacial transport has increased owing to frequent examples of severe lattice mismatch and strain, boundaries with nanoscale non-planar features and, in some cases, the critical role of electron-phonon interactions. This talk will describe measurements and modeling of phonon heat conduction through interfaces in some of the latest semiconductor nanotechnologies and feature a range of material combinations. Examples include GaN-diamond and silicon-diamond composites, chalcogenide-metal multilayers, metal-semiconductor nanolayer stacks, and nonplanar interfaces in modern nanotransistors and interconnect structures. Applications range from conventional CMOS electronics and phase change memory to quantum cascade lasers and RF amplifiers for satellites.