Simulating FinFET Self-Heating for Device Reliability JAMES HAM, LINCOLN CARR, CAROLE GRAAS, Colorado School of Mines — The continual scaling of transistors has led to sharp gradients in temperature (from ballistic transport of carriers) that result in new difficulties modeling device reliability. Current device-level thermal simulations do not track phonon populations, which are necessary to understand damage from high temperatures in scaled devices. A model for simulating highly localized hot spots due to an optical phonon bottle-neck near the channel/drain interface of a device operating in a ballistic transport regime will be presented. Various expansions of the Boltzmann transport equation (spherical harmonic expansion and methods of moments) are compared to a hydrodynamic model for device thermal simulations. We will discuss the post-processing technique for arriving at phonon populations from technology computer aided design (TCAD) simulations.

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