

Abstract Submitted  
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**Nonlinear transport in semiconductor superlattices** MARTIN WINSLOW, Univ of Illinois - Chicago — The transport of electrons and holes within semiconductor superlattices are known to exhibit nonlinear behavior, such as negative differential conductivity. Using a *full band ensemble monte carlo* simulation, this nonlinear behavior is observed when Umklapp scattering is included in the transport for both electrons and holes along the vertical growth direction. Our method allows for the analysis of a broad range of phenomena in superlattice transport due to the inclusion of the full (mini)band structure. Results for several superlattice designs utilized in high performance photodiode applications are presented, along with an overview of how an understanding of the electronic band structure and scattering processes (acoustic and optical phonon, alloy disorder, impact ionization) are utilized in a physical simulation.

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