Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Calculating Effect of Point Defects on Optical Absorption Spectra of III-V Semiconductor Superlattices Based on (8x8) k-dot-p Band Structures DANHONG HUANG, Air Force Rsch Lab-Kirtland, ANDRII IUROV, University of New Mexico, GODFREY GUMBS, Hunter College of the City University of New York, DAVID CARDIMONA, Air Force Rsch Lab-Kirtland, SANJAY KRISHNA, University of New Mexico — For a superlattice which is composed of layered zinc-blende structure III-V semiconductor materials, its realistic anisotropic band structures around the Gamma-point are calculated by using the (8x8)k-dot-p method with the inclusion of the self-consistent Hartree potential and the spin-orbit coupling. By including the many-body screening effect, the obtained band structures are further employed to calculate the optical absorption coefficient which is associated with the interband electron transitions. As a result of a reduced quasiparticle lifetime due to scattering with point defects in the system, the self-consistent vertex correction to the optical response function is also calculated with the help of the second-order Born approximation.

Danhong Huang
Air Force Rsch Lab-Kirtland

Date submitted: 05 Nov 2015 Electronic form version 1.4