

Abstract Submitted
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Carrier lifetimes in group-IV semiconductors¹ NANDAN TANDON, L.R. RAM-MOHAN, Department of Physics, Worcester Polytechnic Institute, Worcester, MA 01609-2280 — We have demonstrated that electron-phonon coupling in semiconductors shows a variation over the Brillouin zone and is not constant as considered traditionally within the long wavelength approximation. In group IV semiconductors, the variation in the electron-phonon coupling can range from 50 – 400 meV. We evaluate electron-phonon coupling matrix elements over the entire Brillouin zone and use this information to calculate the electron lifetimes in group IV semiconductors C, Si, and Ge. Our results, within the framework of the single particle approximation, allow us to evaluate the lifetimes for different initial electron momenta. For our calculations, we have used the methodology developed by Giustino et. al for evaluating the electron-phonon coupling employing the Wannier-Fourier interpolation (Phys. Rev. B **76**, 165108 (2007)).

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