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Second Harmonic Generation in a Graphe Armchair Nanoribbon
GODFREY GUMBS, YONATAN ABRANYOS, Hunter College of CUNY — The second order nonlinear optical susceptibility $\chi^{(2)}$ for second harmonic generation is calculated for the 11H transition of a graded double quantum well (DQW) structure of undoped-$GaAs/Al_xGa_{1-x}As$. These results are compared with the single quantum well (QW). Our results show that the values of $\chi^{(2)}$ have optimal magnitudes dependent on the width, depth and separation between the QWs in a DQW structure. When the electric field increases, the dipole moment increases due to the increasing separation between the electron and hole wave functions. On the other hand, the oscillator strength of the 11H transition is reduced as a result of the decrease in the overlap of the electron and hole envelope functions. These two competing factors give rise to optimal conditions for the enhancement of the second order nonlinear susceptibility $\chi^{(2)}$. It is demonstrated that $\chi^{(2)}$ for the DQW structure is more enhanced than for the biased single QW.

Yonatan Abranyos
Hunter College of CUNY

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