Abstract Submitted
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Electronic Cofinement in SiGe Quantum Dot Arrays[1] MILLICENT AYAKO, Univ of Delaware — Quantum QDs (QDs) are nanoscale semiconducting heterostructures that are highly tunable through changes in their size, shape, strain, and material composition. This makes QDs more efficient and more applicable than most other bulk semiconductors. The use of QDs in photovoltaic cell technology is especially promising since the adoption of renewable resources is vital to curbing the effects of climate change in the near future. Past research has generally only considered a system of a single dot resting on top of a substrate. However, the practical application of QDs requires a greater understanding of the interactions between multiple QDs. The goal of this research was to investigate the degree with which the dimensional, geometric, and spatial characteristics of individual QDs affect the overall confinement potential of an array of QDs. The finite element method was used to compute solutions to the time-independent Schrdinger equation for arrays of varying sizes and shapes. We found that the distance between QDs in an array does not significantly affect the overall confinement potential. However, increasing the number of QDs in an array as well as increasing the size of the individual QDs increases the overall confinement potential of an array.

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