Abstract

Our focus is the examination of decoherence of quantum bits during Förster resonance energy transfer. The quantum bits are implemented using the excited states of an array of Si quantum dots[1]. Study of the coherency of the quantum bits' states is achieved by examining the density matrix equation of motion, which includes interaction with light and phonons as well as excitonic coupling. With this methodology, we explore which structural and operational parameters of the system, such as mutual orientation of the quantum dots and excitation frequency, provide optimal rate of coherent vs decoherent couplings and secure the least perturbed transfer of quantum state.

References

[1] Jiangchao Chen, Andrew Schmitz, and Dmitri S. Kilin. Computational simulation of the p-n doped silicon quantum dot. *International Journal of Quantum Chemistry*, 112(24):3879–3888, 2012.