Abstract

In this thesis we sought to methodically confirm the quantum nature of the quantum dot, for which our mode of confirmation was not the usual entanglement, but rather in the detection of Rabi oscillations. Motivated by the statistical description of photons and the mechanism and structure behind the quantum dot. A rationale for expecting Rabi oscillations is developed, along with a theoretical understanding for Rabi oscillations which include a model used at present. Furthermore, we wished to fine tune this model, by including dampening mechanisms detailed by Huber et. al. in Coherence and Degree of Time-Bin Entanglement from Quantum Dots. The suggested Linblad Master Equation implemented in QuTiP using the master equation solver program. Ground, exciton, and biexciton populations modelled with dephasing present, all three populations oscillating about the 35% population probability. Quantum nature of the quantum dot confirmed, with considerations for further research suggested in the conclusion.

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