

Abstract Submitted
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A Brief Overview of Cavity Quantum Electrodynamics with Periodic Potential – Dyan L. Jones, Department of Physics and Center for Nanotechnology, Miami University, Oxford OH (overview of Masters Thesis). Theoretical study of a cavity QED system is the gateway to understanding how to build pieces of a quantum computer. This study involves a system comprised of a cavity, atom, and optical lattice; the system evolves in time through Quantum Trajectory Formalism, and quantum phenomena are observed. We improve on previous studies of this system by replacing the harmonic approximation with Mathieu functions, and by using Franck-Condon factors to account for the overlap of the excited states. The Intensity-Intensity and Intensity-Field correlation functions are used to find and explain non-classicalities in the system, with the most important result being entanglement.