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Control of Photon Fock States in an Optical Cavity BYRON LOWRY, BEREKET BERHANE, SERGEY DRAKUNOV, Embry-Riddle Aeronautical University — The ability to control quantum mechanical states is an essential requirement for many experiments in fundamental quantum mechanics and applications in quantum information system In this paper we derive the equation governing the dynamics of a single, two state, non-spontaneously emitting atom in a lossless cavity interacting with a single mode. Two different control methods are discussed and the controllability of the system is investigated for each method. The first method involves varying the coupling constant on the electric fieldeld-atom interaction. The second involves pumping or bleeding the system using atoms in the excited and grounds states respectively. A feasibility argument was made for the controllability of the system under those conditions. The dynamics of the system are then shown through arbitrary change of the control variables.

Bereket Berhane
Embry-Riddle Aeronautical University

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