

Abstract Submitted
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Dynamics and fidelity of entanglement of photons coupled to optical fibers and waveguides BEREKET BERHANE, Embry-Riddle Aeronautical University — We investigate the time evolution of the quantum mechanical states of photon-modes in optical fibers and waveguides starting from a multipolar coupling of neutral atoms with a quantized electromagnetic field. We apply our results to the propagation of entangled photons in optical fibers and investigate the fidelity of entanglement for various optical fiber lengths. Furthermore, we obtain a quantum input-output formalism in three dimensions and investigate the dependence of coupling and transfer efficiency on the quantum state of the incident photons. We apply our results to the coupling and propagation of entangled photons for applications in quantum memory transfer over optical fibers and waveguides.

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