

Abstract Submitted
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Quantized Electromagnetic-Field Propagation in General Non-Local and Non-Stationary Dispersive and Absorbing Media¹ VERNE JACOBS, Naval Research Laboratory — Dynamical descriptions for the propagation of quantized electromagnetic fields, in the presence of environmental interactions, are systematically and self-consistently developed in the complimentary Schrödinger and Heisenberg pictures. An open-systems (non-equilibrium) quantum-electrodynamics description is thereby provided for electromagnetic-field propagation in general non-local and non-stationary dispersive and absorbing optical media, including a fundamental microscopic treatment of decoherence and relaxation processes due to environmental collisional and electromagnetic interactions. Particular interest is centered on entangled states and other non-classical states of electromagnetic fields, which may be created by non-linear electromagnetic interactions and detected by the measurement of various electromagnetic-field correlation functions. Accordingly, we present dynamical descriptions based on general forms of electromagnetic-field correlation functions involving both the electric-field and the magnetic-field components of the electromagnetic field, which are treated on an equal footing.

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