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Investigation for the Macroscopic Quantum Electrodynamics to describe light in dielectric material MOOCHAN B. KIM, TAE-WOO LEE, GEORGIOS VERONIS, HWANG LEE, JONATHAN P. DOWLING, Hearne Institute for Theoretical Physics, Louisiana State University, Baton Rouge, Louisiana 70803, USA — Though the behavior of photons in medium can be easily formulated in usual microscopic Quantum Electrodynamics, the presence of matter makes this difficult to describe due to nontrivial degrees of freedom of matter. Alternative approach is to begin with macroscopic Maxwell's equation including a dielectric material. It may be useful to predict the behavior of the system. Until now, a few theories for macroscopic QED was suggested without a confirmation. To discern the proper description for the system, we investigate and suggest experiments for a simple optical interferometer, such as the Hong-Ou-Mandel and Mach-Zehnder interferometers, which may be made in integrated dielectric materials.

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