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Collective Frequencies of Trapped Photon Bose-Einstein Condensate[1] ENRICO STEIN, AXEL PELSTER, TU Kaiserslautern, Germany — In a photon Bose-Einstein condensate the main contribution to the effective photon-photon interaction is due to a thermooptic effect. In order to describe this effect at a mean-field level, we use an open- dissipative Schrdinger equation coupled to a diffusion equation for the temperature of the dye solution. With this we calculate analytically the lowest-lying collective frequencies and damping rates via a linear stability analysis for a harmonically trapped photon BEC. Since it is not possible to investigate its dynamical properties within a variational approach by using an action, we work out an approximation which is based on determining the equations of motion for the lower moments for Gaussian shaped condensate wave function and temperature distri- bution. As a result of the photon-temperature coupling the collective frequencies and damping rates turn out to depend on the diffusive properties of the dye solution. In particular, we examine whether the Kohn theorem is valid, i.e. whether the dipole-mode frequency is the same as the trap frequency.

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