

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Phonon-mediated interactions and polaron formation of slow-light polaritons in a BEC HANNA-LENA HAUG, MICHAEL FLEISCHHAUER, Department of Physics and research center OPTIMAS, University of Kaiserslautern, Germany — We study the motion of dark-state polaritons (DSP) in a Bose-Einstein condensate. DSPs are formed in an atomic ensemble interacting in a Λ -type configuration with two light fields under conditions of electromagnetically induced transparency. In particular, we consider the ground-state atoms to form a BEC which can be well described by a macroscopic Gross-Pitaevskii wavefunction. Taking into account the interaction of pairs of ground-state atoms and between ground and spin-state atoms leads to the formation of polaronic quasi-particles consisting of DSPs and Bogoliubov phonons. In addition, the coupling to phonons results into a coupling between dark and bright-state polaritons as well as into phonon-mediated interactions between DSPs.

Hanna-Lena Haug
Department of Physics and research center OPTIMAS,
University of Kaiserslautern, Germany

Date submitted: 30 Jan 2014

Electronic form version 1.4