Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Numerical Model of Polariton Dynamics in GaAs Quantum Well-Microcavity Structures VINCENT HARTWELL, DAVID SNOKE, RYAN BALILI, University of Pittsburgh — Recent experimental results from GaAs quantum well-microcavity structures show evidence for Bose-Einstein condensation of polaritons. A main indicator of this is a large accumulation of polaritons near k=0 above a critical density threshold. The polariton gas is never in complete equilibrium, however. To model the system, we therefore cannot use an equilibrium model for the momentum distribution; instead, we have developed numerical methods for solving the quantum Boltzmann equation for the polariton momentum distribution, including the effects of polariton-polariton scattering, polariton-phonon scattering, and polariton scattering with free electrons. The model allows direct comparison to experimental results. An unexpected experimental result which we address in our modeling is that at very low densities, the polariton momentum distribution is invariant and independent of density. At high densities, our numerical model predicts the accumulation of polaritons at k=0 is indeed the result of the boson statistics of the particles, and though it is not in complete equilibrium, it has the characteristics of a "quasicondensate."

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Date submitted: 01 Dec 2008 Electronic form version 1.4