

Abstract Submitted
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Polariton Formation Enhances Lifetimes of Dense Exciton Gases in Cuprous Oxide by Suppressing Two-Exciton Decay¹ N. LASZLO FRAZER, Northwestern University, R.D. SCHALLER, Argonne National Lab, Northwestern University, J.I. JANG, SUNY Binghamton, S.E. MANI, J.B. KETTERSON, Northwestern University — Collective excitonic states form at high densities, but in dense gases the long lifetime of excitons in cuprous oxide (Cu_2O) is compromised by two-exciton annihilation processes. Using the picosecond streak camera spectroscopy facility at the Center for Nanoscale Materials at Argonne National Laboratory we directly measured the decay of orthoexciton-polaritons generated by two photon absorption. The two-body decay lifetime is an order of magnitude longer than for excitons uncoupled to photons. The extended lifetime opens opportunities for experiments that manipulate polariton collective states. Unlike time-averaged measurements of two-body processes, streak camera detection shows decay suppression without effects from production efficiency or additional density dependent processes.

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