

Abstract Submitted
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Suppression of quadrupole polariton generation due to large $\chi^{(3)}$ effect in Cu_2O SHAHIN MANI, JOON JANG, JOHN KETTERSON, Northwestern University — Cuprous oxide (Cu_2O) is a dipole-forbidden semiconductor exhibiting a vanishing second-order nonlinear susceptibility and a large third-order nonlinear response.¹ We employ resonant two-photon excitation to create quadrupole polaritons in this semiconductor aiming at the Bose-Einstein condensation of polaritons. Generally, to observe this quantum phase transition, high optical excitations at low temperature is essential. Using a Z-scan setup, we explore the resonant two-photon generation of polaritons in Cu_2O at 2K. Our results suggest that the third-harmonic generation of the incident light severely limits the polariton density at high excitation levels. Based on the measured nonlinear optical parameters, the experimentally achievable polariton density is estimated.

[1] S. Mani, J. I. Jang, and J. B. Ketterson, *Opt. Lett.* **34**, 2817 (2009).

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