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Emission of Cu_2O paraexcitons confined by a strain trap: hints of a Bose-Einstein condensate?

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We monitor the phonon sideband emission from paraexcitons confined in a strain trap in cuprous oxide at $T = 1.25$ K. On the low energy ank of the optical phonon replicas, both of Γ_5^- and Γ_3^- symmetry (the latter activated by application of a magnetic field), we detect sharp peaks that might represent indications for a paraexciton Bose-Einstein condensate. In contrast, such peaks are absent in the phonon-mediated emission of the orthoexcitons, and they also disappear at elevated temperatures. The results challenge our understanding of the involved physics, e. g., of the Auger recombination of excitons, which has so far been believed to prevent crossing the border to a condensate.

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