

Abstract Submitted
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Spontaneous First-order Optical Coherence in Cold Exciton Gases in Coupled Quantum Wells SEN YANG, A.T. HAMMACK, L.V. BUTOV, Department of Physics, University of California, San Diego, A.C. GOSSARD, Materials Department, University of California, Santa Barbara — A Mach-Zehnder interferometer with spatial and spectral resolution was used to probe spontaneous coherence in cold exciton gases, which are implemented experimentally in the ring of indirect excitons in coupled quantum wells[1]. A strong enhancement of spontaneous first-order optical coherence was observed at low temperatures below a few Kelvin where the thermal de Broglie wavelength becomes comparable to the interparticle separation and the exciton gas becomes nonclassical. The onset of spontaneous first-order optical coherence was found to be correlated with macroscopic spatial ordering in the exciton system.[1] L.V. Butov, A.C. Gossard, D.S. Chemla, *Nature* **418**, 751 (2002).

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