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Coherence dynamics of a long-lived excitonic condensate in an optical microcavity[1] KYAW ZIN LATT, Michigan State University, YI-SHAN LI, SHENG-DI LIN, National Chiao Tung University, CHIH-WEI LAI, Michigan State University — We report dynamics of long-range spatial coherence of an excitonic condensate with a ∼1000 ps life-time in a planar Fabry-Perot microcavity. The sample consists of three sets of three InGaAs(8nm)/GaAs (14nm) quantum wells positioned near anti-nodes of the photon field in a GaAs λ-cavity sandwiched by two GaAs/AlAs-based Bragg mirrors. Conventional dynamic exciton-polariton condensates with a ∼10 ps lifetime were observed under a near-resonant (excess energy ∼ 6 meV) ps pulsed excitation at a 50 degree incident angle. Under an excitation above the stop-band of the Bragg mirrors (excess energy ∼170 meV), an excitonic state with 100-μeV luminescence linewidth was observed to last for ∼1 ns. Coherence dynamics were characterized by time-resolved double-slit experiment in a confocal geometry with a ps streak camera system as a function of excitation intensity (fluence) and temperature. The visibility of interference fringes reached above 0.3 within 40 ps and remained above 0.1 up to ∼1ns for a double-slit-distance of 12 μm.

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