Experimental Signatures for Bose-Einstein Condensation of Semiconductor Excitons in a Trap

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Here we report experimental evidences for a grey BEC: We confine long-lived excitons in a trap where we probe a homogeneously broadened gas at controlled density and temperature. We show that the photoluminescence (PL) emitted from the trap anomalously decreases while excitons are cooled to the sub-Kelvin regime. The darkening marks the quantum condensation in the lowest energy dark states. We also reveal that the weak PL radiated from the trap exhibits both quantum spatial coherence and increased temporal coherence below 1K.

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