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Abstract:

We report on the first experimental determination of the coherence length of excitons in semiconductors using the combination of spatially resolved photoluminescence with phonon sideband spectroscopy. The coherence length of excitons in ZnSe quantum wells is determined to be 300–400 nm, about 25–30 times the exciton de Broglie wavelength. With increasing exciton kinetic energy, the coherence length decreases slowly. The discrepancy between the coherence lengths measured and calculated by considering only the acoustic-phonon scattering suggests an important influence of static disorder.