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Equilibration of Two-dimensional Excitons in an In-Plane Harmonic Potential ZOLTAN VOROS, DAVID SNOKE, University of Pittsburgh, LOREN PFEIFFER, KEN WEST, Bell Labs, Lucent Technologies — We report on the equilibration dynamics of a 2D gas of long-lifetime (10 μs), high-mobility excitons trapped in an in-plane harmonic potential produced by inhomogeneous external stress. Spatially indirect excitons are created in a GaAs/AlGaAs double quantum well structure by a quasi-continuous laser pulse. After excitation, the excitons approach equilibrium with a well-defined volume and constant temperature. When the system is far from quantum degeneracy, the effective temperature can be deduced from the spatial profile of the exciton cloud. We show that at the lowest temperatures, the disorder prevents the excitons from reaching the lattice temperature and that the external confining potential is greatly reduced by exciton-exciton repulsion. We discuss the implications of these two phenomena on the possibility of Bose-Einstein condensation of quantum well excitons.

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