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Collective properties of excitons in the presence of a two-dimensional electron gas OLEG BERMAN, NY City College of Technology, City University of New York, GODFREY GUMBS, Hunter College, City University of New York, PATRICK FOLKES, Army Research Laboratory — We have studied the collective properties of two-dimensional (2D) excitons in a quantum well (QW) which contains 2D excitons and a two-dimensional electron gas (2DEG). We also analyzed the excitations for a system of 2D dipole excitons with spatially separated electrons and holes in coupled quantum wells (CQW) when one of the wells contains a 2DEG. Calculations of the superfluid density and the Kosterlitz-Thouless (K-T) phase transition temperature for the 2DEG-exciton system in a QW have shown that the K-T transition temperature increases with increasing exciton density and that it might be possible to have fast long range transport of excitons. The superfluid density and K-T transition temperature for dipole excitons in CQW in the presence of a 2DEG increase with increasing inter-well separation.

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