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BEC and Superfluidity of Magnetoexcitons in Graphene OLEG BERMAN, NYC College of Technology of CUNY, GODFREY GUMBS, Hunter College of CUNY — We propose the experimental observation of Bose-Einstein condensation (BEC) and superfluidity of quasi-magnetoexcitons in bilayer graphene. Electrons are in one layer and holes in another which are controlled by an applied gate voltage. We describe the dilute gas of magnetoexcitons with dipole- dipole repulsion in a strong magnetic field B by a 4×4 matrix Hamiltonian. This Hamiltonian is mapped on to a scalar effective mass Hamiltonian for a dilute gas of dipolar excitons without an applied magnetic field. However, the magnetic field enters through a B-dependent effective mass for magnetoexcitons. Moreover, for N excitons, we reduced the problem in a space with $2N \times 2$ dimensions into one with $N \times 2$ dimensions. This is accomplished by integrating over the coordinates of the relative motion of electron and hole. We will present the energy spectrum of collective excitations, the sound spectrum as well as the effective magnetic mass of magnetoexcitons in the strong magnetic field limit. The superfluid density n_S and the temperature of the Kosterlitz-Thouless phase transition T_c are shown to be increasing functions of the excitonic density n but decreasing functions of B and the interlayer separation D.

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