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# Bose-Einstein condensation in the two-component non-linear exciton gas

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## Abstract

The statistical properties of non-linear two-component ortho-para exciton gas are considered, employing the Bogoliubov variational principle and the mean-field approximation. The exciton concentrations are determined from a set of non-linear self-consistent equations. The exciton distribution functions depend essentially upon the exciton level shifts, which in turn depend on the exciton concentrations. There are three sets of solutions in any range of values of the chemical potential. These solutions mean the existence of three different exciton phases: the para phase, the ortho phase and a mixed ortho-para phase. The most stable of them is the para phase, as was shown by studying the pressure dependence of the chemical potential. In the framework of the non-linear statistics the Bose-Einstein condensation of not only para-excitons but also ortho-excitons may occur.