Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Formation and decay of a Bose-Einstein condensate of trapped dipole excitons GERMAN KOLMAKOV, OLEG BERMAN, ROMAN KEZERASHVILI, New York City College of Technology CUNY, YURII LOZOVIK, Institute of Spectroscopy RAS — We study the nonlinear dynamics of formation and decay of a Bose-Einstein condensate of dipole excitons trapped in an external confining potential in coupled quantum wells. The problem is considered within an analytical approach and in numerical simulations. The trap restricts the spatial distribution of excitons and results in non-uniform density distribution in the exciton cloud. We demonstrate that under typical experimental conditions, regardless of a long-range nonlocal interaction of the dipole excitons, the system can be described by a generalized Gross-Pitaevskii equation with the local interaction between the excitons, and we find the effective interaction constant. In the numerical simulations, we account for the finite lifetime of dipole excitons and generation of the excitons due to continuous laser pumping. We also discuss formation and decay of vortex states in the condensate.

German Kolmakov
New York City College of Technology CUNY

Date submitted: 11 Nov 2011 Electronic form version 1.4