Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Excitonic photoluminescence lifetimes in PbI2 nanoclusters for PbCdI2 semiconductor materials ANATOLII BUKIVSKII, YURIY GNATENKO, YURI PIRYATINSKI, Institute of Physics of National Academy of Sciences of Ukraine, BEES TEAM — We investigated excitonic photoluminescence (PL) spectra and kinetics of PL decays for various wavelengths for $Pb_{1-X}Cd_XI_2$ solid solutions (X = 0.2, X = 0.3, X = 0.4, X = 0.5, X = 0.7). Earlier we had shown that by approximation of the experimental data with stretched exponential function and applying the inverse Laplace transformation to this function we can estimate the average time constant $<\tau>$of the PL decay. Now, instead of measuring single kinetics for several wavelengths, we performed Time Resolved Emission Scanning continuously for all of the self-trapped excitons emission ranges. We developed analytical software that enables us to calculate both the average time constant $<\tau>$of the decay and average lifetime τ of the emission process. This software also enables us to calculate distribution of rate constants $H(k)$for each concentration for each wavelength. By using the demo version of Edinburgh Instruments FAST software, we also calculated continuous distribution of time constants of PL kinetics in $Pb_{1-X}Cd_XI_2$ solid solutions. These distributions show the presence of three different components of the PL signal, which are time-separated. These results strongly correlate with obtained spectral data.

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Date submitted: 06 Nov 2015 Electronic form version 1.4