APPLICATION OF THE METHOD OF EFFECTIVE SUSCEPTIBILITY TO THE SIMULATION OF SCANNING NEAR-FIELD OPTICAL MICROSCOPY

V.O. Vasilenko[1], *V.Z. Lozovski*[1,2]

[1]Taras Shevchenko Kyiv National University
(*5 Build., 2, Academician Glushkov Ave., Kyiv 03022, Ukraine; e-mail: verion@univ.kiev.ua*),
[2]V. Lashkarev Institute of Semiconductor Physics, Nat. Acad. of Sci. of Ukraine
(*45, Nauky Prosp., Kyiv 03028, Ukraine*)

S u m m a r y

We consider the peculiarities of the formation of near-field patterns in ordinary scanning near-field optical microscopy (SNOM) and in ultrafast SNOM (UF-SNOM). The method of effective susceptibility for calculations of near-field images is discussed. The method is based on an analytic solution of the Lippmann–Schwinger equation. By the examples of objects with simple form such as a parallelepiped and a triangular pyramid, we demonstrate the results of numerical calculations of near-field images. It is shown that the form of a near-field image depends on the mutual orientation of the polarization vectors of the probing field of a microscope and the field registered by a detector. We present the results of numerical calculations of near-field images which are obtained in ultrafast SNOM on the study of an exciton cloud generated by a laser pulse. The numerical analysis of the spatial configurational resonances of an exciton cloud which is relaxing. It is shown that, in this case, the nonlinear interactions in the system should be taken into account and *etc.*