The GNLS Solitons in Fiber and Planar Optical Waveguides

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Abstract.

Study of dynamics of the 2D and 3D envelop solitons in fiber and planar optical waveguides is very actual problem. The interaction sufficiently changes their characteristics and background EM field. Problem of the dynamics and stability becomes more complicated if it is necessary to take into account an influence of different dispersive and nonlinear inhomogeneities and nonstationary parameters of optical medium on the soliton structure and evolution. In this case the problem reduces to the generalized nonlinear Schrodinger (GNLS) equation for the amplitude of the EM field with due account of the spatial and temporal inhomogeneities in optical medium. The analysis of stability of the GNLS solitons was based on the Hamiltonian method developed earlier for the BK class of equations. We have found the conditions of existence of the multidimensional stable GNLS optical soliton solutions. Numerical simulation showed that inhomogeneity of medium changes the amplitudes and velocities of the EM waves, their quantity that is caused by their nonelastic interaction in inhomogeneous medium. Nonstationary medium changes form of impulse and affects its spectral features. Changes of modulation of the optical medium parameters leads to variation of character of nonelastic interaction at solitons attraction-repulsion.

Biography.

Prof. Vasily Yu. Belashov, PhD (Radiophysics), DSci (Physics and Mathematics). He is Chief Scientist and Professor at the Kazan Federal University. He is author of 395 publications including 8 monographs.

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