Modeling of Ionosphere Density Modification by Powerful Radio Wave

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The results of simulations of spatio-temporal dynamics of nonlinear structures exited in inospheric plasma under the action of powerful radio emission are presented. Amplitude and phase characteristics of the scattered signal of "caviton" (CS) type, have revealed at the heating facility "Zimenki" (Nizhny Novgorod, Russia) by the method of sounding of artificially disturbed ionosphere by the short radio pulses, are investigated. The theoretical model is based on numerical analysis of nonlinear Shroedinger equation (NSE) with driven extension in inhomogeneous plasma layer. Calculations of amplitude and phase characteristics of srattered probing pulse for the different correlation of it's frequency to powerful radio wave frequency are carried out. The results of numerical simulation correspond qualitatively to the experimental ones and show the caviton formation, evolution and relaxation dynamics. The work was supported in part by RFBR grants 06-02-17334, 07-02-00523.