



Ion-sound rogue waves in plasma with negative ions

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Rogue wave phenomena are actively studied in geophysics (surface, internal, edge and Rossby waves). Recently, the optical rogue waves have been investigated experimentally and numerically. We demonstrate here the existing of the rogue waves in plasma on example of nonlinear ion-acoustic waves in plasma with negative ions. The Gardner equation governing these waves in plasma with the negative ion concentration close to critical is derived. The weakly nonlinear theory of modulational instability based on the use of the nonlinear Schrodinger equation is discussed. The investigation of the nonlinear dynamics of modulationally unstable quasi-harmonic wave packets is carried out by the numerical solution of the Gardner equation. The results are compared with the predictions of the weakly nonlinear theory. It is demonstrated that rogue waves appear due to modulational instability similar to the rogue wind waves on the sea surface.