



Nonlinear Focusing Wave Group on Current

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Rogue wave generation can be explained on the basis of spatio-temporal focusing concept. This focusing can appear on current, which has an impact on the dynamics of rogue waves.

The study reports on a series of numerical simulations based on a BIEM method, designed to investigate the interaction between freak wave and current. The modulated wave trains are numerically generated by a paddle on a uniform current of constant velocity. Hence, the problem under consideration is a boundary value problem. The time-variable frequency of the paddle is chosen to produce a rogue wave (due to spatio-temporal focusing) at a given fetch. Numerical simulations are performed for different values of current velocity. Results are compared to linear theory. It is shown that the shift of the focal point increases as u_c^2 , as predicted theoretically. A spreading of the focusing area and a weak decrease of the rogue wave amplification are observed as the current speed increases. Maximum amplitude freak wave is not found in the same condition while solving linear equations and fully nonlinear ones.