FM26S_12797

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Breaking Internal Waves in a Sheared Fluid with Critical Layers

Oleg G. Derzho

Institute of Thermophysics, RAS, Novosibirsk, Russia

A new model for long internal waves in a sheared flow with a critical layer near either lower or upper rigid boundary has been developed. In such system even small disturbances give rise to a formation of a zone filled with the mixed fluid. One nonlinear differential equation for the wave amplitude is derived in the steady case, in which the nonlinearity arises essentially due to the presence of the mixed zone. Solutions of the obtained equation include periodic waves on the induced mixed layer, a stationary bore and a combinational solution consisting of series of recirculation zones located alternatively near both boundaries.

View the extended summary