Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Bifurcation, stability and nonlinear interaction of gravity-capillary solitary waves BOGUK KIM, TRIANTAPHYLLOS R. AKYLAS, MIT — Gravity-capillary plane solitary waves are known to bifurcate in the form of wavepackets with specific carrier wavenumbers at which the phase speed attains an extremum. Fully nonlinear branches of such solitary waves are obtained via a numerical continuation procedure, and the stability of each bifurcation branch is discussed. Two kinds of stabilities are considered, longitudinal stability (Lstability) under perturbations along the dominant wave propagation direction and transverse stability (Tstability) under perturbations along the transverse direction to wave propagation. Tstability, especially, results in the formation of fully localized gravity-capillary solitary waves, commonly referred to as lumps. Lumps are surprisingly stable coherent structures and follow the same bifurcation scenario as that of plane solitary waves. The formation of lumps and their nonlinear interactions are presented by using unsteady numerical simulations. The outline of the video presentation is as follows: Bifurcation of Benjamin plane solitary waves; Transverse instability of Benjamin plane solitary waves and formation of lumps; Bifurcation of Benjamin lumps; Nonlinear interaction of Benjamin lumps; Description of numerical method.

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Date submitted: 12 Aug 2005 Electronic form version 1.4