Capillary-gravity waves on a dielectric fluid of finite depth under normal electric field

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During the visit at UCL, the problem of two-dimensional capillary-gravity waves on a dielectric fluid of finite depth propagating under the effect of a vertical electric field is considered. The fluid is bounded above by a hydrodynamically passive gas which is perfectly conducting. A schematic is given in figure 1 . Linearly and weakly nonlinear theory are studied. Long wave model equations are derived by using Dirichlet-Neumann Operator. Fully nonlinear computations are achieved by using a time-dependent conformal mapping method. Solitary waves are obtained, and their one-dimensional stabilities are examined numerically. An experiment of excitation is simulated to generate depression wave and elevation generalized solitary wave (see figure 2) . The results have been written in the form of an article which will be soon submitted to European Journal of Mechanics B/Fluids.

Publication

Gao, T., Doak, A., Vanden-Broeck, J.-M. Capillary-gravity waves on a dielectric fluid of finite depth under normal electric field, *Eur. J. Mech. B/Fluids* (in preparation).

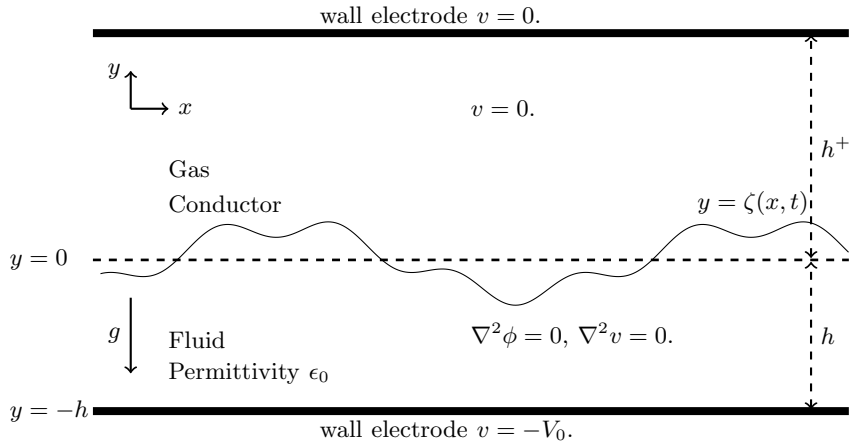

Figure 1: Schematic of the problem.

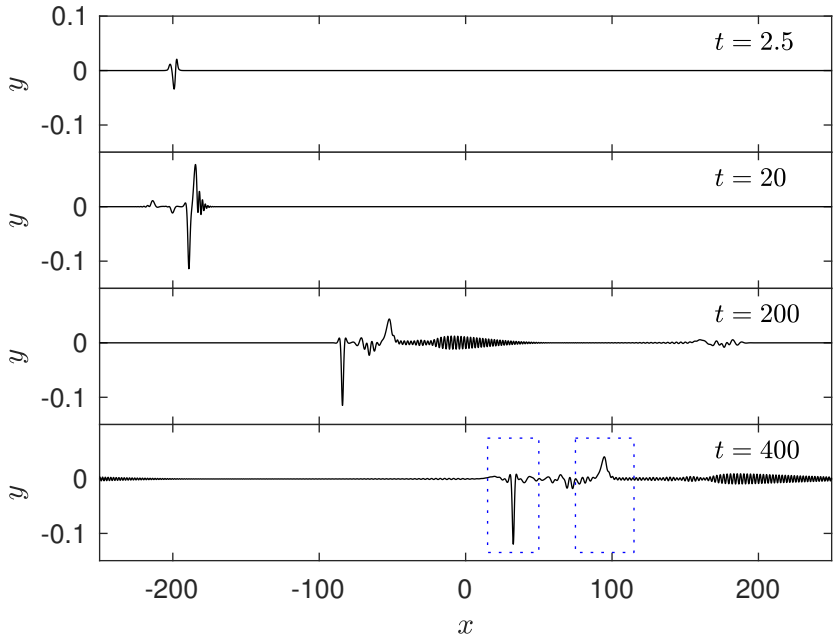

Figure 2: Snapshots of the excitation experiment.