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Can non-propagating hydrodynamic solitons be forced to move? LEONARDO GORDILLO, MARCEL G. CLERC, NICOLAS MUJICA, TANIA SAUMA, YAIR ZARATE, Universidad de Chile, IGNACIO ESPINOZA, Pontificia Universidad Catolica de Chile — Development of technologies based on localized states depends on our ability to manipulate and control these nonlinear structures. In order to achieve this, the interactions between localized states and control tools should be well modelled and understood. We present a theoretical and experimental study for handling non-propagating hydrodynamic solitons in a vertically driven rectangular water basin, based on the inclination of the system. Experiments have shown that tilting the basin induces non-propagating solitons to drift towards an equilibrium position through a relaxation process. Our theoretical approach is derived from the parametrically driven damped nonlinear Schrödinger equation which models the system. The basin tilting effect is incorporated as a spatially inhomogeneous linear correction on dissipation. A motion law for hydrodynamic solitons can be deduced from these assumptions. The model equation, which includes a constant speed and a linear relaxation term, nicely reproduces the motion observed in our experiment.

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