Dissipative Solitary States in Driven Surface Waves

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We present an experimental study of highly localized, soliton-like struc tures that propagate on the two dimensional surface of highly dissipative fluids. Like the well-known Faraday instability, these highly dissipativ e structures are driven by means of the spatially uniform, vertical accel eration of a thin fluid layer. These structures, harmonically coupled to the external driving frequency, are observed above a critical intrinsic " dissipation" in the system (i.e. the ratio of the viscous boundary layer height to the depth of the fluid layer) for a wide range of fluid viscosi ties and system parameters. These highly localized nonlinear states, unli ke classical solitons, propagate at a single constant velocity for given fluid parameters and their existence is dependent on the highly dissipati ve character of the system. The properties of these states are discussed and examples of bound states and two state interactions are presented.

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[2] J. Fineberg and O. Lioubashevski, To appear in Physica A, (1998).