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**Two-dimensional gravity–capillary solitary waves on deep water: Generation and transverse instability.**[1] BEOMCHAN PARK, YEUNWOO CHO, Korea Advanced Institute of Science and Technology (KAIST) — Two-dimensional (2-D) gravity–capillary solitary waves are generated using a moving pressure jet from a 2-D narrow slit as a forcing onto the surface of deep water. The forcing moves horizontally over the surface of deep water with speeds close to the minimum phase speed $c_{\min}$ =23cm/s. Four different states are observed according to forcing speeds. At relatively low speeds below $c_{\min}$, small-amplitude depressions are observed and they move steadily just below the moving forcing. As the forcing speed increases towards $c_{\min}$, nonlinear 2-D gravity–capillary solitary waves are observed, and they move steadily behind the moving forcing. When the forcing speed is very close to $c_{\min}$, periodic shedding of local depressions is observed behind the moving forcing. Finally, at relatively high speeds above $c_{\min}$, a pair of short and long linear waves is observed, respectively, ahead of and behind the moving forcing. In addition, we observe the transverse instability of free 2-D gravity–capillary solitary waves and, further, the resultant formation of 3-D gravity–capillary solitary waves. These experimental observations are compared with numerical results based on a model equation that admits gravity–capillary solitary wave solutions near $c_{\min}$and they agree with each other very well.

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