

KP solitons: Part 1. Experiments

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Abstract:

As the first part of this series, I present laboratory experiments of the KP solitons. The experiments are performed in a wave tank that was designed and constructed specifically for precision experiments for long waves. The tank is equipped with a directional-wave maker, capable of generating arbitrary-shaped multi-dimensional waves; hence the apparatus is adequate for realization of the KP solitons in the real-fluid environment. Temporal and spatial variations of water-surface profiles are captured using the Laser Induces Fluorescent method - a nonintrusive optical measurement technique. Our experiments yield accurate anatomy of the KP solitons and their evolution behaviors, which stimulate the theoretical analysis and the numerical experiments presented in Parts 2 and 3 by Kodama and Kao.

References:

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