

The Generation of Lump Solitons by a Bottom Topography in a Surface-tension Dominated Flow

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Z. Naturforsch. **60a**, 328 – 334 (2005); received January 26, 2005

The generation of lump solitons by a three-dimensional bottom topography is numerically investigated by use of a forced Kadomtsev-Petviashvili-I (KP-I) equation. The numerical method is based on the third order Runge-Kutta method and the Crank-Nicolson scheme. The main result is the pairwise periodic generation of two pairs of lump-type solitons downstream of the obstacle. The pair with the smaller amplitude is generated with a longer period and moves in a larger angle with respect to the positive x -axis than the one with the larger amplitude. Furthermore, the effects of the detuning parameter on the generation and evolution of lumps are studied. Finally the waves propagating upstream of the obstacle are also briefly investigated.

Key words: Kadomtsev-Petviashvili-I Equation; Lump Soliton; Bottom Topography.