



## **Appearance of peaks and holes in the spectrum of three-dimensional fully-nonlinear potential wave fields**

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We investigate the emergence of coherent groups in three-dimensional fully-nonlinear potential deep water waves whose initial spectrum is assumed to be of the JONSWAP type with directional distribution given by  $\cos^n \theta$ , where  $n$  is the integer. The analysis is based on the results of long-term wave simulations performed using a numerical solution of a three-dimensional Laplace equation for the velocity potential subject to nonlinear kinematic and dynamic boundary conditions at the free surface. We describe the appearance of sharp peaks and deep holes in the spectrum. The possible explanations such as an insufficient resolution or existing physical mechanism are discussed. The spectrum peak locations are investigated and it is shown that they migrate, which contradicts the hypothesis of insufficient resolution as the reason for this behavior of the spectrum.