

A portrait of Vladimir Zakharov, a man with glasses, wearing a suit and tie, looking slightly to the right. The background is dark and out of focus.

# The Fifth Brooke Benjamin Lecture on Fluid Dynamics

Wednesday 16 November 2011 at 5pm

Lecture Theatre L1  
Mathematical  
Institute  
University of Oxford

Vladimir Zakharov  
Department of Mathematics  
University of Arizona

## ‘Theory of Wind-Driven Sea’

The self-consistent analytic theory of the wind-driven sea can be developed due to the presence of small parameter, the ratio of atmospheric and water densities. Because of low value of this parameter the sea surface is “weakly nonlinear” and the average steepness of sea surface is also relatively small. Nevertheless, the weakly nonlinear four-wave resonant interaction is the dominating process in the energy balance. The wind-driven sea can be described statistically in terms of the Hasselmann kinetic equation. This equation has a rich family of Kolmogorov-type solutions perfectly describing “rear faces” of wave spectra right behind the spectral peak. More short waves are described by steeper Phillips spectrum formed by an ensemble of micro-breakings. From the practical view-point the most important question is the spatial and temporal evolution of spectral peaks governed by self-similar solutions of the Hasselmann equation. This analytic theory is supported by numerous experimental data and computer simulations.

**All are warmly invited to attend the lecture and reception that follows.**

Please email [hicks@maths.ox.ac.uk](mailto:hicks@maths.ox.ac.uk) to register your attendance.

<http://www.maths.ox.ac.uk/events/brooke-benjamin-lecture>