深圳北理莫斯科大学
УНИВЕРСИТЕТ МГУ–ППИ В ШЭНЬЧЖЭНЕ
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ФЕСТИВАЛЬ ЗНАНИЙ, НАУКИ И КУЛЬТУРЫ
SMBU 知识科学文化节

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报告主题：

Main ideas, applications, and methods in wave turbulence

地点：深圳北理莫斯科大学3教206

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主办单位：深圳北理莫斯科大学计算数学与控制系

Wave turbulence is a state of continuous medium with many random mutually-interacting waves excited over a broad range of wavelengths. An example familiar to everyone—sea waves. Being pleasant and relaxing to watch, the sea waves appear to be a complex physical system which is not so easy to understand and describe. Naturally, understanding of this phenomenon is very important for predicting sea weather and navigation conditions, as well as modelling exchanges of momentum, gas and moisture between the ocean and the atmosphere in weather prediction and climate studies.

Wave turbulence theory provides a mathematical framework for gainng such an understanding. It is very rich and non-trivial as it connects simultaneously several important branches of contemporary physics, mathematical physics and applied mathematics: non-equilibrium statistical mechanics, nonlinear waves, turbulence and kinetic theory.

The power of the wave turbulence approach is in that it applies to a great variety of important physical wave-supporting systems ranging from quantum to cosmological scales: Kelvin waves on quantum vortex filaments and waves in Bose-Einstein condensates, capillary and gravity waves on fluid surfaces, acoustic waves, spin waves in solids, internal and inertial waves in stratified and rotating atmospheres and oceans, optical waves in liquid crystals and optical fibres, elastic waves on metal plates, waves in magnetised astrophysical plasmas and plasmas of fusion devices, waves in early Universe. In this talk, I will give a basic introduction into the ideas, methods and key results of the wave turbulence theory. We will also discuss several important physical systems and explain the role played by wave turbulence in these examples.