

Summer school Danemark, DTU, august 2011.

Wave turbulence

Luc Deike, Claude Laroche and Eric Falcon

Surface waves on a fluid surface is the most common example of wave turbulence. Wave turbulence concerns the dynamical and statistical study of a field of dispersive waves in nonlinear interaction. I will present results of two experiments on gravity capillary wave turbulence.

First, we study the inverse cascade in gravity wave turbulence. Surface waves are forced at an intermediate scale corresponding to the gravity-capillary wavelength. In response, waves at larger scales are observed that exhibit a frequency-power law spectrum, ascribed to the upscale cascade of gravity wave turbulence. Properties of this inverse cascade will be discussed.

The decay of capillary wave turbulence once the forcing is stopped will be next presented. Although non stationary, this transient regime shows a self-similar decay. The power spectrum of wave amplitude is found to be a power law with a constant exponent during the decay, the exponent being close to the predicted stationary one.