

We begin with a short overview of main historical concepts of energy cascading: Richardson (1922), Kolmogorov (1941) and Zakharov (1967).

First two models are developed for a strongly nonlinear system (strong turbulence of vortices) and the latter - for a very weakly nonlinear system (weak turbulence of waves). Both models predict a power law shape of the energy spectrum. A new model will be presented which is developed to fill the gap between strong and very weak nonlinearity: The dynamic cascade. Building on the sidebands from a modulational instability, the theory predicts a cascade of energy into additional sidebands, and the detailed cascade is described by the "chain equation".

The shape of energy spectrum in common case is exponential but can be reduced to a power law, for some choice of initial excitation. The theory is applied to focusing NLS (water waves) and to mKdV; it is also supported by observations in the experiments with water waves.