EGU2020-18419
https://doi.org/10.5194/egusphere-egu2020-18419
EGU General Assembly 2020

Experimental internal gravity wave turbulence

Géraldine Davis[1,2], Thierry Dauxois[2], Sylvain Joubaud[2,3], Timothée Jamin[2], Nicolas Mordant[1], and Clément Savaro[1]

[1]Laboratoire des Ecoulements Géophysiques et Industriels, Université Grenoble Alpes, CNRS, Grenoble-INP, Grenoble, France (geraldine.davis@univ-grenoble-alpes.fr)

[2]Univ Lyon, ENS de Lyon, Univ Claude Bernard, CNRS, Laboratoire de Physique, Lyon, France

[3]Institut Universitaire de France (IUF)

Stratified fluids may develop simultaneously turbulence and internal wave turbulence, the latter describing a set of a large number of dispersive and weakly nonlinear interacting waves. The description and understanding of this regime for internal gravity waves (IGW) is really an open subject, in particular due to their very unusual dispersion relation. In this presentation, I will show experimental signatures of a large set of weakly interacting IGW obtained in a 2D trapezoidal tank.

Due to the peculiar linear reflexion law of IGW on inclined slopes, this setup - for given excitation frequencies - focuses all the input energy on a closed loop called attractor. If the forcing is large enough, this attractor destabilizes and the system eventually achieves a nonlinear cascade in frequencies and wavevectors via triadic resonant interactions, which results at large forcing amplitudes in a k^-3 spatial energy spectrum. I will also show some results obtained in a much larger set-up -the Coriolis facility in Grenoble- with signature of 3D internal wave turbulence.