Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Spatio-temporal characterization of Capillary Wave Turbulence
MICHAEL BERHANU, ERIC FALCON, MSC, Paris Diderot University — Wave Turbulence concerns the study of the statistical properties of a set of numerous nonlinear interacting waves. The archetype of this phenomenon are waves on the surface of a fluid [1]. We report a space-time characterization of Capillary Wave Turbulence, produced in the laboratory at the air-water interface. The three-dimensional shape of the free interface is measured as a function of time, by using an optical method, the "Diffusing Light Photography" [2], associated with a fast camera. Linear and nonlinear dispersion relations are extracted by the computation of the spatio-temporal power spectrum of wave amplitude. When Wave Turbulence regime is reached, we observe power-law spectra both in time and in space, whose exponents are in agreement with the theoretical predictions of Wave Turbulence theory [3].

[1] A. C. Newell and B. Rumpf, Annu. Rev. Fluid Mech. 43, 59 (2011) [2] W. B. Wright, R. Budakian and S. J. Putterman, Phys. Rev. Lett. 76, 4528 (1996)
[3] V. Zakharov, V. L'vov and G. Falkovich (1992) "Kolmogorov spectra of turbulence" Springer-Verlag

Michael Berhanu
MSC, Paris Diderot University

Date submitted: 08 Aug 2012 Electronic form version 1.4