Akhmediev breathers under strong-wind regime D. Eeltink¹, H. Branger², A. Lemoine², <u>M. Brunetti¹</u>, O. Kimmoun², A. Chabchoub³, C. Kharif², J. Kasparian¹

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One of the most important formation mechanism for rogue waves is the modulational instability, a nonlinear process observed in many different fields in physics. Gravity waves on the ocean surface are under the continuous effect of wind that supplies energy and affects the evolution of modulation instability. We investigate the effect of wind of the Akhmediev breathers, first order analytical solutions of the nonlinear Schrödinger equation (NLSE) that reproduce the dynamics of the modulational instability. We report on the experimental results performed in the wind-wave facility at Pythéas-IRPHE in Marseille (France) showing the evolution of Akhmediev breathers under wind regimes of different intensity. We characterize these wind regimes by the spectral mean frequency f_m that is a measure of frequency shift in the spectrum. We compare with analytical and numerical results obtained within the framework of the (forced) NLSE [1, 2] at leading order. A threshold exists in the wind intensity where the spectrum becomes frequency downshifted with $f_m < 0$. We also discuss how the effects of wave-breaking and higher-order nonlinearities compete with those produced by the wind.

References

- [1] M. Brunetti et al. Phys. Letters A 378, 1025 (2014)
- [2] M. Brunetti and J. Kasparian, Phys. Letters A 378, 3626 (2014)