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Observation of resonant interactions among gravity surface waves[1] ERIC FALCON, Université Paris Diderot, MSC, CNRS, Paris, France, FELICIEN BONNEFOY, Ecole Centrale de Nantes, LHEEA, CNRS, Nantes, France, FLORENCE HAUDIN, Université Paris Diderot, MSC, CNRS, Paris, France, GUILLAUME MICHEL, BENOIT SEMIN, Ecole Normale Supérieure, LPS, CNRS, Paris, France, THOMAS HUMBERT, SEBASTIEN AUMAITRE, CEA-Saclay, Sphynx, CNRS, Gif-sur-Yvette, France, MICHAEL BERHANU, Université Paris Diderot, MSC, CNRS, Paris, France — We experimentally study resonant interactions of gravity surface waves in a large basin. We generate two oblique sinusoidal swells of tunable angle, steepness and frequency ratio. These waves interact each other and give birth to a resonant wave whose properties (growth rate and resonant response curve) are fully characterized. A phase locking between waves is also evidenced. All our experimental results are found in good quantitative agreement with 4-wave interaction theory of gravity waves with no fitting parameter. Slightly off-resonance experiments are also reported. For stronger wave steepness, departures from the weakly nonlinear theory are observed. Our results thus strongly extend previous experimental results performed more than 50 years ago.

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