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Slanted Breather Rogue Waves

Amin Chabchoub (1,2), Kento Mozumi (2), Norbert Hoffmann (3,4), Alexander V. Babanin (5), Alessandro Toffoli (5), James N. Steer (6), Ton S. van den Bremer (7), Nail Akhmediev (8), Miguel Onorato (9), and Takuji Waseda (2)

(1) Centre for Wind, Waves and Water, School of Civil Engineering, The University of Sydney, Sydney, NSW 2006, Australia, (2) Department of Ocean Technology Policy and Environment, Graduate School of Frontier Sciences, The University of Tokyo, Kashiwa, Chiba 277-8563, Japan, (3) Dynamics Group, Hamburg University of Technology, 21073 Hamburg, Germany, (4) Department of Mechanical Engineering, Imperial College London, London SW7 2AZ, United Kingdom, (5) Department of Infrastructure Engineering, The University of Melbourne, Parkville, VIC 3010, Australia, (6) School of Engineering, University of Edinburgh, Edinburgh EH9 3FB, United Kingdom, (7) Department of Engineering Science, University of Oxford, Oxford OX1 3PJ, United Kingdom, (8) Research School of Physics and Engineering, The Australian National University, Canberra, ACT 2000, Australia, (9) Dipartimento di Fisica, Università degli Studi di Torino and INFN, 10125 Torino, Italy

Breathers are exact solutions of the uni-directional nonlinear Schrödinger equation (NLS) and are known to describe the spatio-temporal dynamics of rogue waves in the context of modulation instability. We report observations of slanted localized envelope soliton and breather dynamics in a directional water wave basin. The water surface displacement has been stereo-reconstructed using a marker-net, deployed at the center of the basin, and two synchronized high-speed cameras. The results are in very good agreement with the hyperbolic 2D+1 NLS predictions and confirm that short-crested as well as oblique localized waves can be indeed described by a simplified nonlinear hydrodynamic framework.