Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Experimental investigation of the inception of a spilling breaker
DAN LIBERZON, Faculty of Civil and Environmental Engineering, Technion, Haifa, Israel, LEV SHEMER, School of Mechanical Engineering, Tel Aviv University, Tel Aviv, Israel — Conditions for the inception of a spilling breaker were studied in 18 m long tank. Peregrine breather-type wave train was excited to generate breaker at a desired location. Parameters of the breaker were obtained using wave gages and two synchronized 2 Mega pixel cameras operating at 60 fps. The instantaneous surface elevation in the vicinity of the breaker's crest was measured by 5 wave gages, while the local wave shape and the inception of breaking were identified from 18 Mpixel video records of the contact line shape variation at the side wall of the tank. An additional identical camera looking at the wave field from above was used to measure the velocity field in the vicinity of the breaking location using Particle Tracking Velocimetry (PTV). Floating particles with diameter of about 3 mm were used for that purpose. Both cameras were synchronized. The instantaneous crest location and velocity were determined from surface elevation fluctuations records. Actual local instantaneous crest velocities differ from both the phase and group velocities of the dominant wave and are compared with the instantaneous horizontal water velocities at various stages of waves breaking.

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Date submitted: 30 Jul 2013 Electronic form version 1.4