Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

A train of solitary waves breaking on a plane beach YONG SUNG PARK, PHILIP LIU, Cornell University — Traditionally, researches on breaking waves in the near-shore region have focused on mean flow fields of periodic incident waves or a single runup-rundown process of a solitary wave. In these approaches, however, interactions between successively breaking waves are obscure or absent, and it is our objective to investigate the interactions using a train of solitary waves. With the newly built long-stroke wavemaker in the DeFrees Hydraulics Laboratory at Cornell University, we can control the number of the solitary waves as well as separation between waves. Particle Image Velocimetry (PIV) technique with fluorescent seeding particles and an optical filter to exclude scattered laser light from broken surface and air bubbles is employed and the flow field in the surf zone is obtained. So far two-wave cases have been conducted and it is found that as long as the two waves are close enough, they merge into one lump of water body in the surf zone and only one reflected wave is observed in the offshore region. Detailed measurements on water surface profiles, instantaneous velocity fields, depth-averaged velocities and bed shear stresses under breaking waves and the resulting turbulent bores are reported. Hydraulic jumps during rundown are carefully observed and their relevance to the offshore vortices is discussed. Further experimental results with three or more waves in a train will be conducted and presented.

Yong Sung Park
Cornell University

Date submitted: 04 Aug 2008 Electronic form version 1.4