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Impact of plunging breaking waves on a partially submerged cube[1] A. WANG, C. IKEDA, J.H. DUNCAN, University of Maryland, College Park — The impact of a deep-water plunging breaking wave on a partially submerged cube is studied experimentally in a tank that is 14.8 m long and 1.2 m wide with a water depth of 0.91 m. The breakers are created from dispersively focused wave packets generated by a programmable wave maker. The water surface profile in the vertical center plane of the cube is measured using a cinematic laser-induced fluorescence technique with movie frame rates ranging from 300 to 4,500 Hz. The pressure distribution on the front face of the cube is measured with 24 fast-response sensors simultaneously with the wave profile measurements. The cube is positioned vertically at three heights relative to the mean water level and horizontally at a distance from the wave maker where a strong vertical water jet is formed. The portion of the water surface between the contact point on the front face of the cube and the wave crest is fitted with a circular arc and the radius and vertical position of the fitted circle is tracked during the impact. The vertical acceleration of the contact point reaches more than 50 times the acceleration of gravity and the pressure distribution just below the free surface shows a localized high-pressure region with a very high vertical pressure gradient.

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