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The effects of droplet characteristics on the surface features in a rain field[1] R. LIU, H. BROWN, X. LIU, J.H. DUNCAN, University of Maryland — The characteristics of the shape of a water surface in response to the impact of simulated raindrops are studied experimentally in a 1.22-m-by-1.22-m water pool with a water depth of 0.3 m. A rain generator consisting of an open-surface water tank with an array of 22-gauge hypodermic needles (typical needle-to-needle spacing of about $L_0 = 3.5$ cm) attached to holes in the tank bottom is mounted 2 m above the water pool. The tank is connected to a 2D translation stage to provide a small-radius ($< L_0$) horizontal circular motion to the needles, thus avoiding repeated drop impacts at the same location under each needle. The droplet diameters (d) and number of drops per unit time per needle (n) are varied by changing the length of the needles while maintaining the same volumetric flow rate ($n\pi d^3/6$) through control of the water depth in the generator tank. The water surface features, including the crown, stalk and ring waves, due to the impacts of the drops are measured with a cinematic laser-induced- fluorescence (LIF) technique. The dependence of these features on the rain characteristics are discussed.

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James Duncan
University of Maryland

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