

Abstract Submitted
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Impact on Floating Membranes NICOLAS VANDENBERGHE, LAURENT DUCHEMIN, IRPHE, Marseille, France — We report on an experiment focusing on the wave dynamics triggered by the impact of a sphere on a floating elastic membrane. The thin rubber elastic sheet floats on a pool of water. After impact two distinct waves propagate. First a tensile wave propagates at the speed of sound in the elastic material. Behind the longitudinal wavefront the elastic membrane is stretched. A transverse wave, accompanied by fluid motion, propagates in the stretched region. The transverse wave presents a dispersion relation similar to capillary waves but the equivalent “surface tension” is the tension in the membrane, which results from the impact. We investigate the coupling between the two waves, documenting the variation of the “surface tension” with impact speed. The deceleration dynamics of the impactor and the instability of the membrane giving rise to wrinkles will also be discussed.

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