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The water entry of decelerating spheres JEFFREY ARISTOFF, Princeton University, TADD TRUSCOTT, Naval Undersea Warfare Center Newport, ALEXANDRA TECHET, JOHN BUSH, Massachusetts Institute of Technology — We present the results of a combined experimental and theoretical investigation of the vertical impact of low-density spheres on a water surface. Particular attention is given to characterizing the sphere dynamics and the influence of its deceleration on the shape of the resulting air cavity. A theoretical model is developed that yields simple expressions for the pinch-off time and depth. Theoretical predictions compare favorably with our experimental observations, and allow us to rationalize the form of water-entry cavities resulting from the impact of buoyant and nearly buoyant spheres.

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