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Capillary Rebound: Droplets Bouncing on a Fluid Bath LUKE ALVENTOSA, DANIEL HARRIS, Center for Fluid Mechanics, Brown University — The rebound of droplets impacting a fluid interface is studied both experimentally and theoretically. Millimetric drops are generated using a custom 3D-printed drop-on-demand (DOD) generator and impact a deep bath of the same fluid. Measurements are compared directly to the predictions of a quasi-potential model that resolves the time-dependent bath interface shape, droplet trajectory, and droplet deformation. The drop is modeled as a damped harmonic oscillator and its dynamics are directly coupled to the response of the interface through a single-point kinematic match condition which we demonstrate to be an effective and efficient model in certain parameter regimes. The influence of the physical parameters on the drop trajectory, restitution coefficient, and contact time is elucidated, with good agreement between the experiment and theory. This relatively efficient model is then readily extended to capture other physical scenarios, such as the impact of superhydrophobic spheres on a fluid interface. Ongoing and future work will be discussed.

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