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Manipulating a Bouncing Drop by the Use of Virtual Drops MARCOS CABALLERO, MICHAEL SCHATZ, Center for Nonlinear Science and School of Physics, Georgia Institute of Technology, Atlanta, Ga 30332 — Coalescence of a droplet with a fluid bath can be inhibited by oscillating the bath vertically. We propose a form of transport for this system that is non-destructive, reprogrammable, and near-frictionless. Below the Faraday threshold, stable bouncers can be moved using a pulsed infrared laser impinging on the fluid surface. The motion is similar to the interaction of two stable bouncing drops except it is repulsive at short range. The pulsed laser deformation, a virtual bouncer, can form a bound state with a single bouncing droplet. Near the Faraday threshold, walkers can be redirected using selective heating of the substrate. Laser pulses act as singular sources of waves; virtual bouncers. Through this wave interaction, non-trivial trajectories are observed. The transport of these nanoliter sized droplets is quite fast when compared to other forms of transport, on the order of centimeters per second.

Marcos Caballero
Center for Nonlinear Science and School of Physics,
Georgia Institute of Technology, Atlanta, Ga 30332

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