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Bouncing of a Jet off a Newtonian Liquid Surface MATTHEW THRASHER, SUNGHWAN JUNG, HARRY L. SWINNEY, Center for Nonlinear Dynamics, University of Texas at Austin — A viscous liquid stream plunging toward a horizontally moving bath of the same liquid can bounce off the surface without mixing with the bath's fluid. A thin layer of air separates the jet and the bath. The non-coalescing jet ramps off an indentation that it makes in the bath's surface. The jet then moves in a roughly parabolic flight until it hits the translating surface again, where it may bounce a second time. Similar rebounding phenomena, such as the Kaye effect, have been observed in non-Newtonian fluids. However, we report the first observations of a bouncing *Newtonian* liquid jet. We observe the bouncing jet for many different liquids, including silicone oil. The bouncing jet is stable for a large range of parameters, including the oil's viscosity (50 to 520 mPa s), the jet's radius (0.05 to 0.12 cm), the jet's velocity at impact (40 to 170 cm/s, corresponding to nozzle heights 1.7 to 14 cm), and the bath's horizontal velocity (1 to 35 cm/s). The bouncing jet involves an interplay of viscous, inertial, surface, and gravitational forces. By initiating the jet in different ways, up to four stable configurations have been observed for the same experimental conditions. A video entry into the Gallery of Fluid Motion features this research.

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