

Abstract Submitted  
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**Bouncing and walking droplets** JAN MOLACEK, JOHN BUSH, Massachusetts Institute of Technology — Motivated by the hydrodynamic quantum analogue system of Yves Couder, we examine the dynamics of silicone oil drops bouncing on a vertically vibrating liquid bath. We report regime diagrams indicating the dependence of the vertical drop motion on the system parameters. A logarithmic spring model for the interface is developed, and provides new rationale for the regime diagrams. We further examine the spatio-temporal evolution of the standing waves created on the bath surface by repeated drop impacts. Measurement of the tangential coefficient of restitution of drops bouncing on a quiescent bath enables us to accurately determine all the major forces acting on the drop during flight and impact. By combining the horizontal and vertical dynamics, we thus develop a model for the walking drops that enables us to rationalize both the extent of the walking regime and the walking speeds. The model predictions compare favorably with experimental data in the parameter range explored.

John Bush  
Massachusetts Institute of Technology

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