

Abstract Submitted  
for the DFD19 Meeting of  
The American Physical Society

**Bouncing Dynamics of Liquid Marbles** NIKOLAY IONKIN, DANIEL HARRIS, Brown University — Liquid marbles are millimetric droplets of fluid coated in a hydrophobic powder, which behave like soft solids that can readily roll and bounce. In this talk, we demonstrate that a liquid marble bouncing on a vertically vibrated surface demonstrates a period-doubling cascade to chaos as the vibration amplitude is increased. The resulting sequence of bifurcations is highly reminiscent to that of the extensively studied 1D model of a bouncing ball on a vibrating platform. Unlike the classical model however, our bouncer is relatively soft, and thus the time duration of contact with the surface is significant relative to the vibration period. The experimental results are directly compared to predictions of a simple bouncing spring model. Our findings may help further elucidate the subtle mechanical behavior of these complex fluid objects.

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Date submitted: 31 Jul 2019

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