Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Time evolution of surface waves created by a walker on a vibrated bath[1] LOIC TADRIST[2], JEONG-BO SHIM, TRISTAN GILET, PETER SCHLAGHECK, University of Liege, IPNAS TEAM, MICROFLUIDICS LAB TEAM — A droplet bouncing on a vertically vibrated bath may be propelled horizontally by the Faraday waves that it generates at each rebound. This association of a wave and a particle is called a walker. It represents a unique macroscopic analogue of the wave-particle duality and pilot-wave dynamics in quantum mechanics. During the interaction of two walkers, we have shown previously that the bouncing phases of the droplets may vary, creating a pathway to chaos. However, the existing theories of Eddi (2011) and Molaček (2013) were built for steady walkers for which bouncing phases are constant. We report systematic measurements of the spatio-temporal evolution of the surface elevation of a vertically vibrated bath after a localized impact. Wave-field measurements were done using a synthetic schlieren technique. Those measurements are rationalized thanks to a simplified theory of capillary waves emitted by a walker. The theory is based on a description of the surface as a parametrically-driven damped oscillator in Fourier space. The theory finely describes the absolute time dependency of the wave-field.

[1]This work was supported by the ARC Quandrops of the Belgium Wallonia-Brussels Federation.
[2]FNRS

Loic Tadrist
Univ de Liege

Date submitted: 28 Jul 2017 Electronic form version 1.4