Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Diffraction and interference of walking drops[1] GIUSEPPE PUCCI, Department of Mathematics, MIT; The Hatter Department of Marine Technologies, University of Haifa, DANIEL M. HARRIS, Department of Mathematics, UNC Chapel Hill; Department of Mathematics, MIT, JOHN W. M. BUSH, Department of Mathematics, MIT — A decade ago, Yves Couder and Emmanuel Fort discovered a wave-particle association on the macroscopic scale: a drop can bounce indefinitely on a vibrating bath of the same liquid and can be piloted by the waves that it generates. These walking droplets have been shown to exhibit several quantum-like features, including single-particle diffraction and interference. Recently, the original diffraction and interference experiments of Couder and Fort (Couder, Y. & Fort, E. *Phys. Rev. Lett.* **97**, 154101 (2006)) have been revisited and contested (Andersen, A. *et al.* *Phys. Rev. E* **92**(1) 013006 (2015)). We have revisited this system using an improved experimental set-up, and observed a strong dependence of the behavior on system parameters, including drop size and vibrational forcing. In both the single- and the double-slit geometries, the diffraction pattern is dominated by the interaction of the walking droplet with a planar boundary. Critically, in the double-slit geometry, the walking droplet is influenced by both slits by virtue of its spatially extended wave field.

[1]NSF support via CMMI-1333242

Giuseppe Pucci
Department of Mathematics, MIT; The Hatter Department of Marine Technologies, University of Haifa

Date submitted: 01 Aug 2016 Electronic form version 1.4