Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Control of Drop Motion by Mechanical Vibrations MICHAEL BESTEHORN, BTU Cottbus-Senftenberg, Cottbus, Germany — Since the first experimental observations of Michael Faraday in 1831 it is known that a vibrating liquid may show an instability of its flat free surface with respect to oscillating regular surface patterns. We study thin liquid films on a horizontal substrate in the long wave approximation. The films are parametrically excited by mechanical horizontal or inclined oscillations. Inertia effects are taken into account and the standard thin film formulation is extended by a second equation for the vertically averaged mass flux. The films can be additionally unstable by Van der Waals forces on a partially wetting substrate, leading to the formation of drops. These drops can be manipulated by the vibrations to move in a desired direction. Linear results based on a damped complex valued Mathieu equation as well as fully nonlinear results using a reduced model will be presented, for more details see [1,2].

[1] M. Bestehorn, Q. Han and A. Oron, Nonlinear pattern formation in thin liquid films under external vibrations, Phys. Rev. E **88**, 023025 (2013).
[2] M. Bestehorn, Laterally extended thin liquid films under external vibrations, Phys. Fluids **25**, 114106 (2013).

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Date submitted: 03 Jul 2014 Electronic form version 1.4