

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Free oscillations of a magnetic drop¹ ERIC FALCON, TIMOTHEE JAMIN, YACINE DJAMA, Paris Diderot University, MSC, CNRS, Paris, France —
When a flattened drop of liquid is put on a substrate subjected to vertical vibrations, it undergoes a parametric instability above a critical acceleration. An azimuthal pattern occurs around the drop and oscillates at half the forcing frequency: a star-shaped drop is then observed made of several oscillating lobes. Here, we use a drop of ferrofluid, a magnetic liquid that responds to an external magnetic field. We report an experimental study of a ferrofluid drop on a superhydrophobic substrate vertically vibrated in presence of a weak vertical magnetic field of tunable amplitude. We find that the eigenmode frequencies of the drop are shifted by the magnetic field. We show that this shift is due to an interaction between the magnetic field and standing waves on the drop top.

¹This work was supported by ANR Turbulon 12-BS04-0005.

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Date submitted: 01 Aug 2014

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