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**Thin Film Behavior Under External Vibrations** MICHAEL BESTEHORN, QI HAN, Dep. Theoretical Physics, BTU Cottbus, Germany — We study the dynamics of a thin liquid film on a horizontal or weakly inclined substrate. The film is parametrically excited by mechanical vertical and horizontal oscillations. Inertia effects are taken into account and the standard thin film formulation is extended by a second equation for the mean flow rate

$$q(x,t) = \int_0^{h(x,t)} u(x,z,t)\, dz \ ,$$

where $h$ is the film thickness and $u$ the horizontal velocity. The set of two coupled PDEs for $h$ and $q$ allows for resonances and instabilities of the flat film due to external vibrations. Linear results based on a damped Mathieu equation as well as fully nonlinear results in the frame of longwave approximation found numerically will be presented. For certain regions in the amplitude-frequency plane as well as for certain forms of the excitations we obtain standard Faraday patterns like oscillating squares, but also hexagons and much more involved spatial and temporal pattern formation are observed.

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