A model for Faraday pilot waves over variable topography

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About 10 years ago Yves Couder, Emmanuel Fort, and co-workers discovered that droplets walking on a vibrating bath possess features of both waves and particles. These millimetric droplets synchronize with their Faraday wavefield, creating a macroscopic pilot-wave system. Interestingly, many of the observed peculiar behaviour happens when the drop interacts with obstacles submerged in the bath. In this talk we explore a simple hydrodynamic model capable of capturing the interaction between bouncing drops and a variable topography. We show through numerical simulations that the reduced equations reproduce some important experiments involving the drop-topography interaction, such as non-specular reflection, refraction, and the single-slit pattern observed. Finally, we revisit the double-slit experiments, and present a combined numerical and experimental investigation of diffraction in bouncing drops.