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Pilot-wave dynamics in confined geometries DANIEL M. HARRIS, JOHN W.M. BUSH, MIT — Yves Couder and coworkers have demonstrated that millimetric droplets can propel themselves along the surface of a vibrating fluid bath by virtue of their pilot-wave dynamics, and that these walking droplets exhibit several features reminiscent of microscopic quantum particles. We here present the results of an experimental investigation of droplets walking in confined geometries, giving particular attention to elucidating the dynamics and statistics of the walking droplets. The behaviour depends critically on the amplitude of the vibrational forcing, specifically, the proximity to the Faraday threshold, which determines the spatio-temporal extent of the guiding wave field. Near the Faraday threshold, we demonstrate that a coherent statistical behavior emerges from the complex underlying nonlinear dynamics, and that, as in quantum mechanics, the statistics can be readily described with a linear wave equation.

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