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Schrödinger's drop in a box: wave-droplet interaction in a circular cavity[1] TRISTAN GILET, University of Liege — A walker is a bouncing droplet on a liquid surface that is horizontally propelled by the Faraday waves it generates. This hydrodynamic wave-particle interaction exhibits many quantum-like behaviors. The horizontal trajectory of a walker becomes chaotic when subject to horizontal confinement. Experiments (Harris et al., PRE 2013) reveal that the statistics of the walker position is shaped by the eigenmodes of the cavity in which it is confined, similarly to a quantum particle in a box. In this talk, I introduce a model of the coupling between a bouncing droplet and a surface wave in a cylindrical container. The resulting iterated map captures many features of experimental observations of walker dynamics under confinement. Moreover, the statistical behavior of the map is shown to be surprisingly similar to the solution of Schrödinger equation for a particle in an infinite potential well. This yields an analogy between the Planck constant and the hydrodynamic wave-particle coupling constant.

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