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Quantum-like approach for a wave-particle system in fluid mechanics REMY DUBERTRAND, MAXIME HUBERT, PETER SCHLAGHECK, NICOLAS VANDEWALLE, THIERRY BASTIN, JOHN MARTIN, Universite de Liege — A droplet bouncing on a vibrating bath can mimic, close to the Faraday instability threshold, a wave particle system called a walker. Walkers have attracted considerable attention during the past decade due to their remarkable analogy with quantum duality. This was initiated by the pioneering experiment by Y. Couder et al. in 2006, which reported the observation of a diffraction pattern in the angular resolved profile of walkers, which go to a single slit. While the occurrence of this wave-like phenomenon can be qualitatively linked to the coupling of the droplet with the associated bath surface wave, a quantitative model for the description of the motion of a droplet propelled by the surface wave in the presence of boundaries and obstacles still represents a highly difficult question. This problem is all the more stimulating as several recent experiments have reported clear effects of the geometry on the dynamics of walking droplets. I will present a simple model [1] inspired from quantum mechanics to model a walker in an arbitrary geometry. We propose to describe its trajectory via a Green function approach. The Green function is associated to the Helmholtz equation with Neumann boundary conditions on the obstacle(s). [1] R. Dubertrand et al., New J. Phys. (2016), in press

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