



Séminaire du Laboratoire de l'Accélérateur Linéaire

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Mardi 10 Avril 2012 à 11 :00

Wave-particle duality with naked eye

We have recently discovered a macroscopic object composed of a material particle dynamically coupled to a wave packet. The particle is a droplet bouncing on the surface of a vertically vibrated liquid bath; its pilot-wave is the result of the superposition of the surface waves it excites. You will see an excitation threshold, this symbiotic object, designated as a walker becomes self-propelled. Such a walker exhibits several features previously thought to be specific to the microscopic realm. The unexpected appearance of both uncertainty and quantization behaviors at the macroscopic scale lies in the essence of its classical duality. The dynamics of the droplet depends on previously visited spots along its trajectory through the surface waves emitted during each bounce. Although based on fundamental concepts, commonly found in living systems, this path-memory driven dynamics is still unexplored in physics elementary objects. This new class of memory-encoded systems which possess a spatiotemporal nonlocality shakes the frontiers between macroscopic and microscopic world. In this talk, I will present the dynamics of this object in experiments similar to the historical ones in quantum physics : diffraction and interference through slits, tunneling, Landau quantization. I will also discuss the implications for quantum objects.

Salle 101 du LAL - Bât. 200, Orsay

Thé et café seront servis 1/4 h avant le séminaire



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