The Sixth Brooke Benjamin Lecture on Fluid Dynamics
Wednesday 17 October 2012 at 5pm

Lecture Theatre L1
Mathematical Institute
University of Oxford

Professor Yves Couder
Laboratoire Matière et Systèmes Complexes
Université Paris Diderot

A fluid dynamical wave-particle duality

Wave-particle duality is a quantum behaviour usually assumed to have no possible counterpart in classical physics. We revisited this question when we found that a droplet bouncing on a vibrated bath could become self-propelled by its coupling to the surface waves it excites. A dynamical wave-particle association is thus formed. Through several experiments we addressed the same general question. How can a localized and discrete droplet have a common dynamics with a continuous and spatially extended wave? Surprisingly several quantum-like behaviours emerge; a form of uncertainty and a form of quantization are observed. I will show that both properties are related to the "path memory" contained in the wave field. The relation of this experiment with the pilot-wave models proposed by de Broglie and by Bohm for quantum mechanics will be discussed.

All are warmly invited to attend the lecture and reception that follows.

Please email hicks@maths.ox.ac.uk to register your attendance.

http://www.maths.ox.ac.uk/events/brooke-benjamin-lecture