

The Sixth Brooke Benjamin Lecture on Fluid Dynamics

Wednesday 17 October 2012 at 5pm

Lecture Theatre L1
Mathematical
Institute
University of Oxford

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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>