

MMEC SEMINAR SERIES

MECHANICS: MODELLING, EXPERIMENTATION, COMPUTATION

Tuesdays @ 4:00pm – Room 3-370

September 09, 2014

Hydrodynamic quantum analogs: droplets walking on the impossible pilot wave

John Bush

Massachusetts Institute of Technology

Yves Couder and coworkers have discovered that droplets walking on a vibrating fluid bath exhibit several features previously thought to be exclusive to the microscopic, quantum realm.

These walking droplets propel themselves by virtue of a resonant interaction with their own wave field. Thus, the system is reminiscent of the double-wave pilot-wave dynamics envisaged by Louis de Broglie.

New theoretical developments provide rationale for the complex behavior of the bouncing droplets, and yield a trajectory equation for the walking droplets.

Experimental and theoretical results in turn reveal and rationalize the emergence of quantization and wave-like statistics from pilot-wave dynamics in a number of settings.

The relation between this hydrodynamic system and various realist models of quantum dynamics is discussed.

Seminar Host: Ken Kamrin (kkamrin@mit.edu)

Please join us for refreshments beforehand, outside Room 3-370

For more information, visit our website at <http://web.mit.edu/mmec/>

Series Organizers: Ken Kamrin (kkamrin@mit.edu); Pedro Reis (preis@mit.edu); Kostya Turitsyn (turitsyn@mit.edu)

Coordinators: Tony Pulsoni (x3-2294, pulsoni@mit.edu), and Rebecca Fowler (x4-7567, rfowler@mit.edu)