

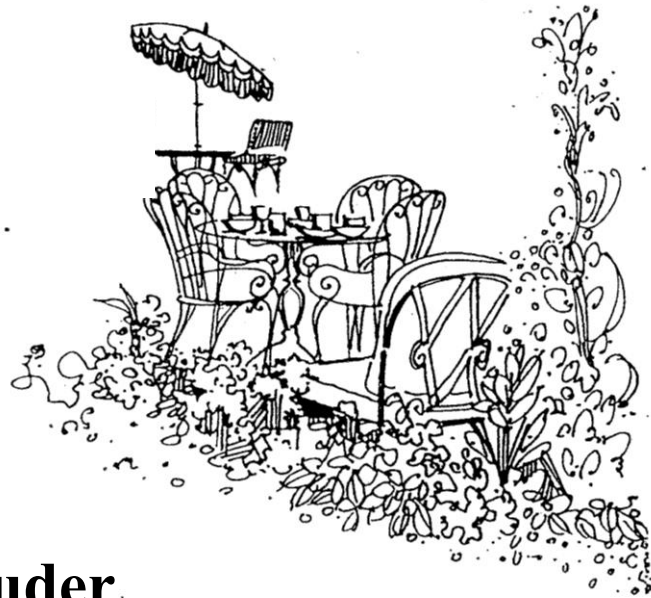
Chez Pierre

Presents ...

Friday, October 15, 2010

2:00pm

MIT Room 4-331



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“A wave-particle duality at a macroscopic-scale ”

A droplet bouncing on a vertically vibrated liquid interface excites surface waves. For large forcing amplitudes, there is symmetry breaking bifurcation by which the droplet and its associated wave become spontaneously propagative. We thus obtain an association of a particle (the droplet) and a wave. How can they have a common dynamics?

I will present several experiments on this system, showing that whenever the wave is split (diffraction, interference, tunneling etc...), an uncertainty appears in the droplet behavior. Another asset of this system is that when a transverse force is exerted on the droplet its possible orbits take a discrete set of quantized values. To what extent these results can be compared to the quantum situation will be discussed. Finally I will show that these interesting behaviours are due, in our system, to a spatio-temporal non-locality that we called its wave-mediated path memory.