TIFR Centre for Interdisciplinary Sciences
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Seminar

Quantum mechanics-like behaviour of a classical object: a droplet walking on a vertically vibrated liquid surface

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In a series of experiments by Fort et al [Nature 437, 208 (2005)], a liquid, taken in a flat square cell, is vibrated at a frequency close to but below the Faraday instability. When a droplet of the same liquid is placed on the liquid surface, under certain conditions it can keep on bouncing forever. When the amplitude of vibration exceeds a critical value, the droplet starts walking on the liquid surface in a rectilinear motion. As the droplet walks, it emanates waves as it interacts with the surface and it seems to be riding on its own waves. The moving droplet along with the associated wave has been termed together as a “walker". Interestingly, the walker shows behaviours that are reminiscent of the quantum world, like quantization of the probability of particle position, diffraction, interference pattern, tunneling etc. We have developed a hydrodynamic theory to understand this interesting phenomenon. In this talk, I will first briefly discuss the experiment and then present our theory, its predictions and possible generalization to a larger class of phenomena.

Friday, Nov 6th 2015

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS