

Talk 1: Interfacial Phenomena and Biocapillarity

We consider physical systems dominated by the influence of surface tension. A number of canonical systems are considered with a view of developing physical intuition for interfacial flows. Examples from biology are considered, with particular attention given to elucidating natural strategies for water-repellency, underwater breathing, fluid transport and propulsion.

Talk 2: Pilot-wave hydrodynamics

Yves Couder and coworkers have recently discovered that droplets walking on a vibrating fluid bath exhibit several features previously thought to be peculiar to the microscopic, quantum realm. These walking droplets propel themselves by way of a resonant interaction with their own wave field, and represent a macroscopic realization of the pilot-wave dynamics envisaged by Louis de Broglie, which was superseded by the Copenhagen Interpretation as the standard view of quantum mechanics. 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 fluid system and de Broglie's pilot-wave theory is discussed.