MPIDS Colloquium

MAX-PLANCK-GESELLSCHAFT

The shape of flowing water

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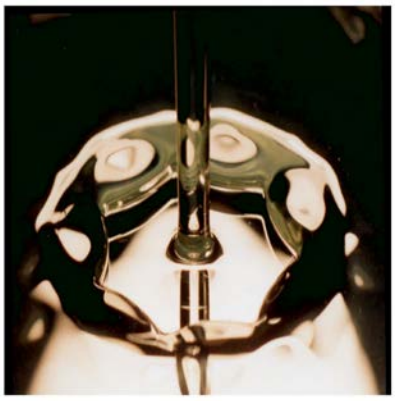
When we observe fluid flows in nature, it is often because we notice the deformation of the fluid surface e.g., when light reflects on a water drop or an ocean wave. Such deformations can have great beauty and complexity, since the shape of the free surface is intimately and very nonlinearly coupled to the internal flow. In the talk, I will show examples of surfaces with shapes of thin needles or sharp walls and that lead to interesting symmetry breaking transitions, where sharp corners and polygonal structures appear - even in strongly turbulent flows. The existence of such structures, even in very "simple" flows, shows the complexity of the solutions to the Navier-Stokes equations with a free surface. Since the work of E. Madelung, it has been known that the Schrödinger equation can also be expressed as a fluid flow, and it has been suggested by Y. Couder and his collaborators that the mysteries of quantum mechanics can be imitated by bouncing droplets interacting through surface waves. I shall discuss this exciting possibility briefly, but argue that the full spectrum of quantum effects cannot be obtained in this way.



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MPIDS, Seminar room 0.77, Am Faßberg 17, Göttingen

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