2018 Jacques Solvay International Chair in Physics

Professor Bernard Derrida

Collège de France, Paris, France

Program

INAUGURAL LECTURE ON TUESDAY 23 OCTOBER AT 4.00 P.M.

The importance of large deviations in non-equilibrium systems

Statistical Physics allowed to unify, at the end of the 19th century, Newton's mechanics and thermodynamics. It gave a way to predict the amplitude of fluctuations around the physical laws which were known ad that time. Einstein, in his very first works, showed that the measurement of these fluctuations allowed to estimate the size of atoms. His reasoning, which was at the origin of the linear response theory, applied to the black body gave one of the first evidences of the duality wave-particle in Quantum Mechanics. Statistical Physics gives also a framework to predict large deviations for systems at equilibrium. In the last two decades, major efforts were devoted to extend our understanding of the statistical laws of fluctuations and large deviations to non-equilibrium systems. This talk will try to present some of the main recent progresses.

COFFEE AND TEA WILL BE SERVED AT 3.45 P.M.
AND DRINKS AT 5.00 P.M. IN FRONT OF THE SOLVAY ROOM

SOLVAY ROOM
Building N.O. 5th Floor
Université Libre de Bruxelles
Campus Plaine - Boulevard du Triomphe
Access 2- 1050 Brussels

www.solvayinstitutes.be

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Lecture 1: Thursday 18 October (15.00 - 17.00, Solvay Room)

Lecture 2: Wednesday 24 October (15.00 - 17.00, Solvay Room)

Lecture 3: Thursday 25 October (15.00 - 17.00, Solvay Room)

Lecture 4: Friday 26 October (15.00 - 17.00, Solvay Room)

Disorder, growth and exclusion

There has been major progress over the last period on our understanding of fluctuations and large deviations in non-equilibrium systems. For example the same theory can be used to describe the growth of a colony of bacteria, the slow combustion of paper, the displacement of magnetic interfaces or vortex lines, or road traffic. This series of lectures will try to describe the main models (exclusion, polymers in random media, ballistic deposition) considered in this theory and the large variety of theoretical approaches, in particular its links with the Kardar Parisi Zhang equation which was introduced in 1986. They will also explain the relation to Quantum Physics, in particular with systems of interacting bosons and with the theory of random matrices.

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