DCU Nobel Laureate Lecture Series in association with Magnet Networks

11th November 2013

Photo: U. Montan

Serge Haroche

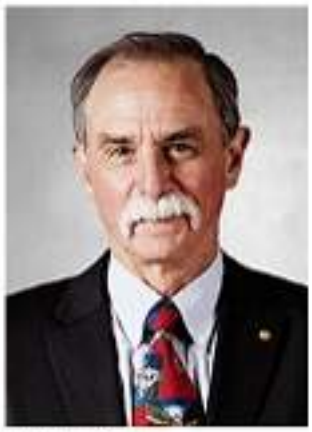
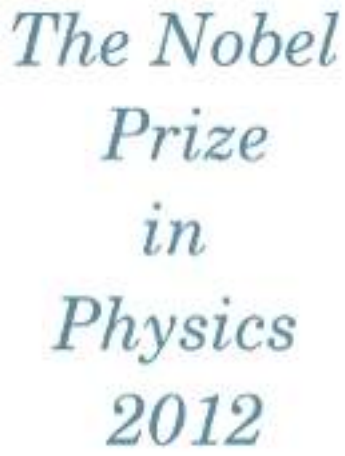


Photo: U. Montan

David J. Wineland



Event details are as follows:

"Controlling photons in a box and raising Schrödinger cat states of light"

Presented by: **Prof Serge Haroche**, Nobel Laureate for Physics 2012

Date and Time: **Monday, 11th November at 11am**

Venue: Mahony Hall, The Helix, Dublin City University

Students Arrive: 10.30am

Students to be in their seats: 10.45am

Event conclusion: 12.15pm

To register a class for the event please contact Ita McGuigan, DCU School Liaison Office, by email at ita.mcguigan@dcu.ie

Telephone: 01-7005080.

Please note there are a limited number of places available.

Dear Physics teacher,

It gives us great pleasure to invite you and your students to the DCU Nobel Laureate Lecture, which will take place in the Helix, Dublin City University on 11th November at 11am.

We are honoured, this year, to host Serge Haroche. The Nobel Prize in Physics 2012 was awarded jointly to Serge Haroche and David J. Wineland *"for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems".*

The topic of the lecture in DCU is "*Controlling photons in a box and raising Schrödinger cat states of light*". In the early days of quantum physics, the founding fathers of the theory used to imagine "thought experiments" in which they assumed that they were manipulating and observing isolated quantum systems evolving according to the strange and counterintuitive laws which they had just discovered.

At that time, they believed that these experiments would remain forever virtual. Technological advances have recently changed this state of affairs and made possible the actual control and manipulation of isolated quantum particles, in ways which were previously thought impossible to achieve.

Many laboratories around the world are now realizing such experiments, which constitute a new domain of research at the frontier between physics and information science. At the fundamental level, the goal of these studies is to explore the transition between the microscopic world where quantum laws are dominant and our macroscopic environment, which appears to be "classical".

More practically, physicists are hoping that these experiments will open the way to new technologies exploiting the strange logic of the quantum world to compute, communicate or measure physical quantities better than what was previously conceivable.

In Ecole Normale Supérieure in Paris, Professor Haroche performs such experiments by juggling with atoms interacting with microwave photons trapped between highly reflecting superconducting mirrors. His team has realized the non-destructive counting of photons, the recording of field quantum jumps and the preparation of superposition states of radiation analogous to the famous "Schrödinger cat" that the Austrian physicist had imagined to be suspended between life and death. The team have also studied the decoherence of these states, i.e. the process by which they lose in a short time their strange "quantumness".

Professor Haroche will give a simple description of these experiments and compare them to similar studies performed on other systems.

Yours sincerely,
Ita McGuigan.
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