From the Einstein-Bohr Debate to Quantum Information: a New Quantum Revolution

by

Professor Alain Aspect

Institut d'Optique Graduate School, Palaiseau
Member of the French Academy of Sciences
Foreign Member of the Royal Society, UK
Wolf Prize in Physics (2010)

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Abstract:

In 1935, with co-authors Podolsky and Rosen, Einstein discovered a weird quantum situation, in which particles in a pair are so strongly correlated that Schrödinger called them "entangled". By analyzing that situation, Einstein concluded that the quantum formalism is incomplete. Niels Bohr immediately opposed that conclusion, and the debate lasted until the death of these two giants of physics.

In 1964, John Bell discovered that it is possible to settle the debate experimentally, by testing the now celebrated "Bell's inequalities", and to show directly that the revolutionary concept of entanglement is indeed a reality. A long series of experiments, started in 1972, yield more and more precise results, in situations closer and closer to the ideal theoretical scheme.

After explaining the debate, and describing some experiments, I will also show how this conceptual discussion has prompted the emergence of the new field of quantum information and quantum technologies.

Date: 15 February 2017 (Wednesday)

Time: 4:30 pm

Venue: Connie Fan Multi-media Conference Room
4/F, Cheng Yick-chi Building
City University of Hong Kong

Enquiries: Miss Mandy Chan
Tel: 3442 4666
Fax: 3442 0322
Email: vprtdl@cityu.edu.hk

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