

2015 International Jacques Solvay Chair in Physics Inaugural Lecture



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A Quantum Leap in Quantum Information

Building Quantum Computers and Quantum Simulators with Cold Atoms and Ions

On a microscopic scale our world is governed by quantum physics. Apart from fundamental questions and ‘mysteries’ of quantum physics, learning how to control this microscopic world is also an opportunity for new applications and quantum technologies - potentially more powerful than their classical counterparts. In this lecture we discuss recent progress in building quantum computers and quantum simulators. We will focus on quantum optical systems of atoms and ions manipulated by laser light, providing prime examples of quantum systems, which can be controlled on the level of single quanta. This includes a discussion of trapped ions as a universal quantum processor, and digital and analog quantum simulation of strongly correlated quantum matter with atoms in optical lattices. We conclude with an outlook on a ‘quantum internet’ and building a ‘quantum annealer’.

Tuesday 6 October 2015 at 4.00 P.M.

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

SOLVAY ROOM

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