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Press Release

## Prof. Immanuel Bloch is honoured with Hector Science Prize 2012

**On 1 February 2013, the Hector Science Prize 2012 was formally bestowed on Immanuel Bloch, Professor of Experimental Physics at the Ludwig Maximilians Universität Munich (LMU) and Director at the Max-Planck -Institute of Quantum Optics. The Prize is valued at 150,000 euros.**



Photo: Philip Morris Foundation

The Hector Foundation has awarded its Science Prize 2012 to Professor Immanuel Bloch for his groundbreaking work in the area of quantum simulation with ultracold atoms trapped in optical lattices, for his wholehearted commitment to teaching, and for his interdisciplinary approach to both research and teaching. Together with this year's other two prizewinners, Bloch now joins the select group of eminent Hector Fellows.

In 2008 Professor Immanuel Bloch became a Director at the Max-Planck-Institute of Quantum Optics, where he heads the Division of Quantum Many-Body Systems, and was appointed Professor of Quantum Optics at LMU Munich in 2009. His primary research interest is concerned with exploring ultracold quantum systems at

temperatures close to absolute zero.

With the aid of intersecting laser beams Professor Bloch creates electromagnetic traps in which atoms can be confined within a crystalline lattice made of light. These optical lattices can serve as model systems for the study of solid-state physics, and their properties can be controlled with high precision. For instance, the experimenter can accurately define the structure of the artificial lattice, and tune the strength of the interaction between the atoms within it. This capability also provides a way to investigate previously inaccessible areas of parameter space, allowing one to probe the behavior of matter under the most extreme conditions. In their latest experiments he and his colleagues have even been able to record snapshots of a many-body quantum systems with single-atom resolution. Indeed, not only can single atoms be imaged in this way, they can also be individually controlled and manipulated.

Bloch's work has opened up a new interdisciplinary research area at the interface between atomic physics, quantum optics, quantum information processing and condensed matter physics, and his contributions to research have been recognized by many accolades. Bloch was the recipient of a Leibniz Prize from the *Deutsche Forschungsgemeinschaft* in 2005, and won the Max Planck Society's Otto Hahn Medal in 2002. In 2003 he received the Rudolf Kaiser Prize and in 2005 the Federal Cross of Merit. In 2005 he was chosen to receive the Annual Prize of the International Commission of Optics, and in 2011 he won the

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Senior Prize for Fundamental Aspects of Quantum Electronics and Optics awarded by the European Physics Society.

The Hector Foundation was established in Weinheim in 1995 by Dr. Hans-Werner Hector and his wife Josephine. Its primary purpose is to promote progress in science and education, and help German researchers to hold their own in international competition. In a second initiative, the Hector Foundation II was set up in 2008, and is designed to complement and extend the activities of the first body. *Text: LMU*

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