

Garching, May 30, 2017

Press Release

## **Prof. Ignacio Cirac is elected member of the Nationale Akademie der Wissenschaften Leopoldina**

The Board of the “Deutsche Akademie der Naturforscher Leopoldina – Nationale Akademie der Wissenschaften” has elected Professor Ignacio Cirac, Director at the Max Planck Institute of Quantum Optics in Garching and Head of the Theory Division, a member in recognition of his “scientific achievements and personality”. Professor Ignacio Cirac is a worldwide renowned physicist in the field of quantum physics and quantum information theory.

Founded in Schweinfurt in 1652 as *Academia Naturae Curiosorum*, the *Leopoldina* is the world’s oldest continuously existing academy for medicine and the natural sciences. Among its more than 7000 members in all since the Academy was founded are eminent scholars and scientists as Johann Wolfgang von Goethe, Alexander von Humboldt, Justus von Liebig, Charles Darwin, Albert Einstein, Marie Curie, and Max Planck. In 2008, the *Leopoldina* was appointed “German National Academy of Sciences”. Following the tradition of an “altehrwürdige Gelehrtengesellschaft”, the academy’s goal is not only to promote science but also to participate in discussions on social and political questions. Today, about 1500 renowned scientists from Germany, Austria, Switzerland and many other countries are active members of the society.



A strong focus of Prof. Cirac’s (*Photo: Thorsten Naeser*) research is the simulation of the behaviour of quantum many-body systems with ultracold atoms in optical lattices. For example, such systems can serve as models for solid states crystals. This work will lead to a better understanding of macroscopic phenomena such as magnetism and superconductivity, but it also aims to get a deeper understanding about the true nature of light and matter.

At the centre of Prof. Cirac’s research is also the development of a new information theory based on the laws of quantum mechanics. New ways of controlling the world of atoms, molecules, and photons are being explored in order to exploit their quantum mechanical properties for storing and communicating quantum information with ever higher efficiency and security. These investigations are leading to new concepts for future quantum computers. The Theory Division of Prof. Cirac has for example developed new concepts for logical elements such as quantum gates that have already been implemented by experimental physicists. Furthermore, the group develops new algorithms for quantum communication, designs new quantum networks making use of the special properties of quantum particles, and creates new theoretical tools to characterize and quantify e.g. entanglement of remote quantum systems.

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**Information on Ignacio Cirac:**

Professor Ignacio Cirac was born in the City of Manresa in 1965. He studied theoretical physics at the Universidad Complutense de Madrid where he received his PhD in 1991. He began his career in physics as a “Professor Titular” at the Universidad de Castilla-La Mancha where he stayed till 1996. In 1996 he became Professor at the department of Theoretical Physics at the University of Innsbruck. Since 2001 he has been Director at the Max Planck Institute of Quantum Optics and head of the Theory Division.

Professor Ignacio Cirac is a world-expert in the field of quantum information and quantum computation. In 2005 he was awarded the “Quantum Electronics Prize” of the European Science Foundation. In May 2006 he was the youngest ever winner of the renowned Royal Spanish Prince of Asturias Prize, and in the same year he received the International Quantum Communication Award together with Professor Peter Zoller (University of Innsbruck). In 2009 he shared the “Frontiers of Knowledge Award in Basic Sciences” of the Spanish BBVA Foundation as well as the Benjamin Franklin Medal of the Franklin Institute in Philadelphia (USA) with Professor Peter Zoller. In January 2013 he received both the Israeli Wolf Prize and the Niels Bohr Medal. In 2014, Prof. Cirac received the Honorary Doctor from the University of Zaragoza. In 2015 he got the Hamburg Prize for Theoretical Physics. In January 2016 he was elected ordinary member of the Royal-Spanish Academy of Sciences, and in October 2016 he received the Honorary Doctorate from the Universidad Europea de Madrid. *Olivia Meyer-Streng*

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