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Leopoldina
Nationale Akademie
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NATIONAL ACADEMY OF
SCIENCE AND ENGINEERING



Quantum Technologies

International Conference

May 9 – 10, 2011

München,
Deutsches Museum (Ehrensaal)

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Registration:

Please register by 5 May 2011:

<http://interplan.de/reg/2011/Leopoldina11/index.htm>

There is no registration fee.

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Venue:

Deutsches Museum | Ehrensaal
Museumsinsel 1 | 80538 München

How to get to the venue from the central station:

- Several S-Bahn train lines to "Isartor" station (S1, S2, S3, S4, S6, S7 & S8)
- Underground lines U1 and U2 to "Fraunhofer Straße"
- Bus no. 132 to "Boschbrücke"
- Tram no. 18 to the Deutsches Museum, tram no. 17 to Isartor.

For further information on the venue please visit
www.deutsches-museum.de

Deutsche Akademie der Naturforscher Leopoldina
– Nationale Akademie der Wissenschaften –

acatech – Deutsche Akademie der Technikwissenschaften

Berlin-Brandenburgische Akademie der Wissenschaften
(für die Union der deutschen Akademien der Wissenschaften)

Quantum technologies in the 21st century

The technological progress of the 20th century was driven by electronics and photonics. At the beginning of the 21st century there is already substantial evidence that the use of coherence and entanglement of composite quantum mechanical systems will propel technological applications. Indeed, today quantum mechanics is no longer restricted to physics but plays an important role in many other disciplines such as chemistry, electrical engineering, and mathematics. Quantum Science has emerged as a common denominator that encompasses all key elements of these previously separate disciplines.

The purpose of this conference is to assemble a number of leading scientists from various fields to present a wide range of quantum physics and technological fields which are affected by quantum technology, from fundamental research (e.g. superconducting devices and biology) to real-world applications (e.g. communications, metrology and semiconductor technology). Additionally, there will be a panel discussion on the economic perspectives of quantum technologies.

Programme

Monday 9 May 2011

- 9:15 a.m. | **Opening**
Wolfgang Heckl (Munich)
- Welcome**
Gunner Berg (Halle)
- 9:30 a.m. | **Emergent Quantum Technologies:
the Exploitation of Quantum Coherence**
Peter Knight (London)
- 10:00 a.m. | **Quantum metrology with cold atoms**
Mark Kasevich (Stanford)
- 10:30 a.m. | **Probing Strongly Interacting Quantum Matter
using Ultracold Quantum Gases**
Immanuel Bloch (Munich)
- 11:00 a.m. | **Coffee break**
- 11:30 a.m. | **Futures of Quantum Communication:
Quantum Memories for Quantum Networks
and Device-Independent QKD**
Nicolas Gisin (Geneva)
- 12:00 noon | **Nonlinear quantum optics in superconducting
circuit quantum electrodynamic systems**
Barry Sanders (Calgary)
- 12:30 p.m. | **Quantum Science and Technology with
Superconducting Electronic Circuits**
Andreas Wallraff (Zurich)
- 1:00 p.m. | **Lunch at Deutsches Museum**
- 2:00 p.m. | **Exploring quantum magnetism with
ultracold atoms**
Markus Greiner (Harvard)
- 2:30 p.m. | **Semiconductors – a potential platform
for quantum technologies?**
Manfred Bayer (Dortmund)
- 3:00 p.m. | **Coherent control of dense Rydberg gases**
Tilman Pfau (Stuttgart)
- 3:30 p.m. | **Coffee break**
- 4:00 p.m. | **Quantum Coherence, Decoherence,
and Phase Transition Dynamics**
Wojciech Zurek (Los Alamos, Ulm)
- 4:30 p.m. | **Beyond Stokes, a Tale of Two Vector Spaces**
Joseph Eberly (Rochester)

- 5:00 p.m. | **Quantum Networks with Atoms and Photons**
Christopher Monroe (Maryland)
- 5:30 p.m. | **Integrated quantum photonics**
Jeremy O'Brien (Bristol)

Tuesday 10 May 2011

- 9:15 a.m. | **Quantum cryptography, twenty year later**
Artur Ekert (Oxford, Singapore)
- 9:45 a.m. | **Optical Quantum Technology for
Communication and Sensing**
Gerd Leuchs (Erlangen)
- 10:15 a.m. | **Coherent Atomtronic Devices**
Nicholas Bigelow (Rochester)
- 10:45 a.m. | **Coffee break**
- 11:15 a.m. | **Quantum Technology taken to its (speed) limit**
Tommaso Calarco (Ulm)
- 11:45 a.m. | **What Quantum technology can learn from quantum
biology of light harvesting, light reception, and magnetic
field reception**
Klaus Schulten (Urbana)
- 12:15 p.m. | **Quantum effects in biology: A new playground
for Quantum Information Scientists**
Martin Plenio (Ulm)
- 12:45 p.m. | **Lunch**
- 2:00 p.m. | **Panel discussion:**
Economic potential of quantum technologies
Doris Schmitt-Landsiedel (Munich)
Peter Russer (Munich)
Nicolas Gisin (Geneva)
Moderator: Patrick Regan (Munich)
- 3:30 p.m. | **Coffee break**
- 4:00 p.m. | **Interference - the mother lode of quantum technology**
Gunnar Björk (Stockholm)
- 4:30 p.m. | **Optical multimode entanglement –
from ideas to practical devices**
Hans Bachor (Canberra)
- 5:00 p.m. | **Engineering in the noise:
when technology meets the quantum of light**
Howard Carmichael (Auckland)
- 5:30 p.m. | **Quantum control on a nanoscale**
Myungshik Kim (London)
- Scientific coordination:
Wolfgang Schleich (Ulm)