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**Award ceremony in Jerusalem on 13 May 2010**

## **Anton Zeilinger is Presented the Wolf Foundation Prize**

**Next week quantum physicist Anton Zeilinger will be awarded the Wolf Foundation Prize in Physics by the President of the State of Israel Shimon Peres. This award is one of the most prestigious international prize after the Nobel Prize. Peter Zoller, Scientific Director of the Institute for Quantum Optics and Quantum Information (IQOQI), praised his colleague Zeilinger and his work as “an historically momentous contribution to the fundamentals of quantum physics”.**

In the thirty two years of its existence, the Wolf Prize has been awarded to 45 physicists, with a dozen Nobel laureates among them. The Prize will jointly be awarded to Anton Zeilinger, John Clauser and Alain Aspect for their fundamental work in quantum mechanical entanglement. “Based on the theoretical work of John Bell, Clauser, Aspect and Zeilinger have transferred the paradoxes formulated by Einstein and other scientists in the 1930s to the laboratory, thereby making it possible to investigate them experimentally,” recounts Prof. Peter Zoller. “The scientists have notably contributed to the fundamental understanding of quantum physics. With experiments in teleportation and quantum cryptography, Zeilinger has advanced this field towards application,” underlines Zoller.

### **From supposition to experiment**

In the recent history of physics, the names Clauser, Aspect and Zeilinger are closely connected with measurements of the Bell theorem. Entanglement is a key concept in quantum mechanics. For entangled states, first introduced by Einstein, Rosen and Podolsky (EPR), quantum mechanics proposes a strong correlation between measurements of two particles, which is stronger than in classical physics. While Einstein considered this as a problem in quantum mechanics in the sense of a ‘local realism’, which he discussed in form of thought experiments, it was John Bell who first formulated inequations, which eventually provided the link for quantitatively investigating these questions experimentally. “Clauser in his early work and later Aspect and Zeilinger refuted these local and realistic theories by their experiments with entangled photons. These experiments have proved to be an important contribution to quantum physics and a fundamental cornerstone for current research in quantum information, which

has become a widely investigated research field internationally. Their research work was pioneering in the field of quantum physics," says Zoller.

### **Quantum physics: Austrian scientists as leaders in their field**

Anton Zeilinger's award shows once more that Austrian physicists are leaders in the field. "This successful research focus has a very broad basis in Austria," remarks Peter Zoller. "Anton Zeilinger, Hans Briegel, Rainer Blatt, Rudolf Grimm and several others are outstanding researchers who have assumed a leading role internationally in their respective fields. In the last couple of years Austria has become one of the world's most renowned quantum physics nations." The basis for this success is the continuous institutional development and scientific funding, which has been supported by the Austrian Science Fund with a Special Research Area, the Austrian Academy of Sciences with the foundation of the Institute for Quantum Optics and Quantum Information, the Universities and the Ministry of Science strongly supporting this development over the years. "Successful basic research has been planned and supported long term," says Zoller. "With this successful research on quantum communication, quantum cryptography and quantum computers we are now not far away from translating research results into applications," says Peter Zoller underlining the fundamental importance of basic research for progress and development in science and the economy with the help of quantum technologies.

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