



# **The Second Quantum Revolution**

Wilhelm and Else Heraeus-  
Symposium honoring Alain Aspect  
at the French Embassy in Berlin

November 10th, 2017

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### Scope of the conference

The symposium will be held in honour of Alain Aspect for his pioneering contributions in the field of quantum optics. It will bring together - for one day - at the French Embassy in Berlin highly motivated, young scientists and students mainly from Germany and France and world-leading scientists, amongst them three Nobel laureates. So, the event will provide a unique opportunity for the young scientists to *entangle* with the pioneers. Their presentations and the following discussions will focus on those scientific findings and breakthroughs, that led to „The Second Quantum Revolution“. Its far-reaching scientific and technological implications will largely be discussed.

The symposium will take place on Friday, November 10th 2017. Lectures will start at 9:00 am and last the whole day. Food, beverages, and entrance are free. For security reasons pre-registration - confirmed by the embassy - is necessary. We recommend to do this early.

More Information: **[www.wissenschaft-frankreich.de/zweitequantenrevolution](http://www.wissenschaft-frankreich.de/zweitequantenrevolution)**

Contact and registration:  
[sqr2017@physik.fu-berlin.de](mailto:sqr2017@physik.fu-berlin.de)

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Program

09.00	Arrival	
09.30 –10.00	Welcome	Ambassador J. Mlynek Th. Breton
10.00 –11.15	Session A Talk 1 Talk 2	Chair: W. Schleich C. Cohen-Tannoudji I. Bloch
11.15 –11.45	Pause	Coffee
11.45 –13.00	Session B Talk 3 Talk 4	Chair: Chr. Salomon J. Dalibard P. Zoller
13.00 –14.15	Lunch	Invited by the Ambassador
14.15 –16.00	Session C Talk 5 Talk 6 Talk 7	Chair: O. Benson E. Giacobino G. Leuchs Chr. Silberhorn
16.00 –16.30	Pause	Coffee
16.30 –17.45	Session D Talk 8 Talk 9	Chair: PhGrangier W. Ketterle B. Phillips
17.00 –17.15	Pause	
17.15 –18.00	Final Session Conclusion	Chair: L.Wöste A. Aspect



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Alain Aspect and the Second Quantum  
Revolution

The development of quantum mechanics in the beginning of the 20th century forced scientists and philosophers to change radically their concepts to describe and handle the microscopic world. A few decades later this led to a technological revolution, allowing one to build transistors, lasers, solar cells and more. In 1964 John Stuart Bell drew the attention to yet another extraordinary quantum feature called entanglement: Quantum Mechanics describes a pair of entangled objects as a single global quantum system, impossible to be thought of as two individual objects, even if the two components are far apart. Discovered by Einstein and Schrödinger in 1935, the amazing character of entanglement had been overlooked by most physicists, until Bell demonstrated that there is no way to understand entanglement in the framework of the usual ideas of a physical reality localized in space time and obeying causality, the local realistic viewpoint advocated by Einstein and refuted by Bohr. The unambiguous experimental violation of Bell's inequalities was established by Alain Aspect, who revealed - in the frame of his PhD thesis (1974-1983) - the most extraordinary features of entanglement. Based on entanglement, a new revolution is under way, which promises to yield another technological revolution with totally new concepts at work in quantum information and quantum metrology: The Second Quantum Revolution. Its basis was established by the visionary and pioneering work of Alain Aspect. The symposium will provide an adequate stage for having the key players present the underlying physical concepts, ideas and visions.