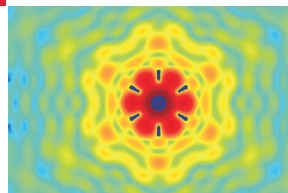


# Quantum Atom at 100 – Niels Bohr's Legacy



193<sup>rd</sup> Annual Congress of the Swiss Academy of Sciences (SCNAT)  
21-22 November 2013 | Winterthur

with Nobel Laureate 2012 Serge Haroche

sc | nat 

Swiss Academy of Sciences  
Akademie der Naturwissenschaften  
Accademia di scienze naturali  
Académie des sciences naturelles

## Quantum Atom at 100 – Niels Bohr's Legacy

In July 1913, the Philosophical Magazine published Niels Bohr's article "On the Constitution of Atoms and Molecules". In this work, the first model of an atom based on the introduction of a then new quantity, the elementary quantum of action, was presented and discussed. Its appearance marked the beginning of both Bohr's extraordinary scientific career and an unprecedented development in the understanding of the physics of matter. Bohr's model of the hydrogen atom, although first questioned by some but appreciated by Einstein, was so successful in explaining earlier results of spectroscopic observations that it was soon refined and extended to other light elements, mainly by Sommerfeld.

In the following years, Bohr acted as one of the figureheads in reforming the physical understanding of nature by using the concept of energy quanta. In his apparently stimulating environment and under his guidance, a group of young scientists was leading in translating the so-called old theory of quanta into the new concept of quantum mechanics. This concept continues to serve as the basis of the physical understanding of nature up to this day.

The Annual Congress 2013 of SCNAT is dedicated to commemorate Bohr's strike of genius 100 years ago and to pay tribute to its impact on parts of the development of physics and its applications that followed from it. Twelve distinguished speakers will cover a selection of different topics. A public evening lecture, given in German, will address some particular characteristics of quantum mechanics.

## Programme

Thursday, 21 November 2013

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- 9.15 Registration and Coffee
- 10.00 Welcome by Thierry Courvoisier, President of SCNAT
- 10.10 Welcome by Hans Rudolf Ott, President of the Organising Committee

### History

Chair: Jan Lacki, University of Geneva

- 10.15 **Helge Kragh**, University of Aarhus, Denmark  
**Aspects of Bohr's 1913 Atomic Theory**
- 11.15 **Olivier Darrigol**, UMR SPHère, CNRS, Paris, France  
**From Bohr's Atom to Quantum Mechanics**
- 12.15 Lunch

### Hydrogen beyond Bohr

Chair: Aldo Antognini, ETH Zurich/PSI

- 13.45 **Thomas Udem**, MPI Quantum Optics, Garching, Germany  
**Ultrahigh-Resolution Spectroscopy of the Hydrogen Atom**
- 14.45 **Randolf Pohl**, MPI Quantum Optics, Garching, Germany  
**Muonic Hydrogen: Atomic Physics for Nuclear Structure**
- 15.45 Coffee Break
- 16.15 **Michael Doser**, CERN, Geneva, Switzerland  
**Antihydrogen: Past, Present, Future**
- 17.15 **Ruth Durrer**, University of Geneva, Switzerland  
**Hydrogen, the Most Abundant Element in the Universe**
- 18.15 Aperitif

### Public Evening Lecture (in German)

Chair: Hans Rudolf Ott, ETH Zürich

- 19.30 **Reinhard Werner**, Leibniz Universität Hannover, Deutschland  
**Die Bohr-Einstein-Debatte zur Quantenmechanik**

Friday, 22 November 2013

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### Spin-Offs

Chair: Antoine Weis, University of Fribourg

- 9.00 **Jacques Vanier**, University of Montreal, Canada  
**Defining and Measuring Time: From Cesium to Optical Clocks**
- 10.00 Coffee Break
- 10.20 **Frédéric Merkt**, ETH Zurich, Switzerland  
**Rydberg States of Atoms and Molecules**
- 11.20 **Serge Haroche**, ENS and Collège de France, Paris, France  
**Manipulating Trapped Photons and Raising Schrödinger Cats of Light**
- 12.20 Lunch

### Other Developments up to Present

Chair: Hans Peter Beck, University of Bern

- 13.45 **Yuri Oganessian**, Joint Institute for Nuclear Research,  
Flerov Laboratory of Nuclear Reactions, Dubna, Russia  
**At the End of the Periodic Table**
- 14.45 **Heinrich Leutwyler**, University of Bern, Switzerland  
**Insights and Puzzles in Particle Physics**
- 15.45 Coffee Break
- 16.15 **Rienk van Grondelle**, Free University of Amsterdam, The Netherlands  
**Quantum Mechanics and Photosynthesis**
- 17.15 Closing Remarks

## General Information

**Venue:** Zurich University of Applied Science in Winterthur  
Aula Campus St. Georgenplatz 2, 8401 Winterthur

**Congress fees:** Admission to the Congress is free

**Getting there:** We recommend arrival by public transport!  
The Campus St. Georgenplatz is located directly off Winterthur Main Station.  
From the city side exit of the station, there is a 5-minute walk to St. Georgenplatz.

**Parking:** A Park & Ride is located above the Main Station. Another two car parks are located around St. Georgenplatz: the Manor shopping centre (2-minute walk) and the Theater car park (3- to 4-minute walk).

**Accommodation:** Different categories of hotels are available in Winterthur.  
Reservations should be made directly by the participants. We recommend to use the booking system offered by [winterthur-tourismus.ch](http://winterthur-tourismus.ch)

**Catering:** Coffee breaks, aperitif and lunch are offered to registered participants.

**Registration:** Registration is required.  
Please register before 1<sup>st</sup> November 2013 at <http://congress13.scnat.ch>

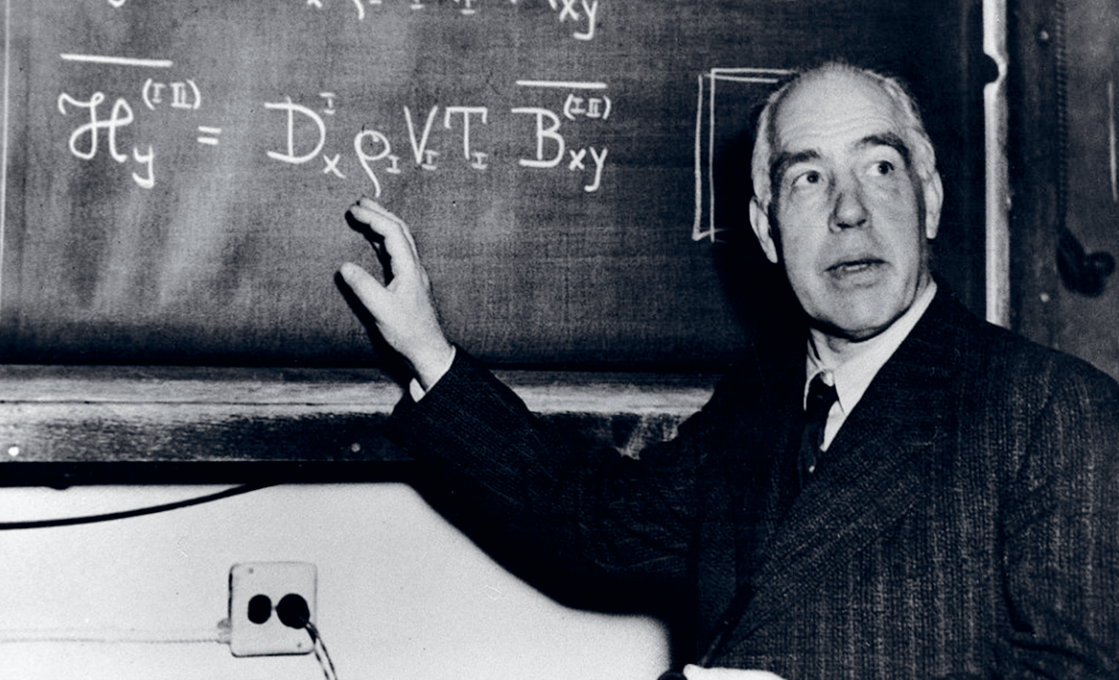
**Programme:** The programme is available online. All registered participants will receive a printed version at the congress reception desk.

**Cultural activities in Winterthur:** Winterthur offers some excellent museums and exhibitions, such as:

- Technorama, Switzerland's only Science Centre where science becomes an experience of the senses;
- Winterthur Museum of Nature, a family-friendly, snazzy museum of nature;
- Collection Oskar Reinhart "Am Römerholz", a distinguished private collection of the 20<sup>th</sup> century;
- Museum for Photography Winterthur, the Swiss Mecca of photography
- For other cultural venues see [winterthur-tourismus.ch](http://winterthur-tourismus.ch)

**Organisation:** Swiss Academy of Sciences (SCNAT), "Platform Mathematics, Physics and Astronomy", Bern | Chair: Hans Rudolf Ott, ETH Zurich

**Information and contact:** <http://congress13.scnat.ch>  
General Secretariat SCNAT | Schwarztorstrasse 9 | 3007 Bern  
Tel. +41 31 310 40 20 | Fax +41 31 310 40 29  
E-Mail: [info@scnat.ch](mailto:info@scnat.ch)



## 15 Essays über den «Sokrates unter den Physikern» (in German)

Roger Zurbruggen führt in 15 faszinierenden Essays in die Welt von Niels Bohr an der Schnittstelle von Physik und Philosophie: [kongress13.scnat.ch/e/essays](http://kongress13.scnat.ch/e/essays)

## SCNAT – network of knowledge for the benefit of society

The Swiss Academy of Sciences (SCNAT) has 35,000 experts working at regional, national and international level for the future of science and society. It strengthens awareness of the sciences as a central pillar of cultural and economic development. The breadth of its support makes it a representative political partner. The SCNAT links the sciences, provides expertise, furthers the dialog between science and society, identifies and evaluates scientific developments and lays the groundwork for the next generation of natural scientists. It is part of the association of the Swiss Academies of Arts and Sciences.