

LECTURE SERIES SCIENCE AND PHILOSOPHY

**Non-Locality and What to Do With It**

Prof. Dr. **Michael Esfeld**, Philosophy, University of Lausanne  
Prof. Dr. **Nicolas Gisin**, Quantum Physics, University of Geneva

**Friday, May 23, 2014, 17:00–19:00**

**Collegium Helveticum, Schmelzbergstrasse 25, 8006 Zürich**

**ETH**

Eidgenössische Technische Hochschule Zürich  
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# COLLEGIUM HELVETICUM

LABORATORIUM FÜR TRANSDISZIPLINARITÄT

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## Non-Locality and What to Do With It

Joint Lecture by:

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In 1935, Einstein and others brought up a famous dilemma according to which quantum mechanics must either be incomplete or violate the principle of locality, i.e. the assumption that there can be no causal relations between space-like separated events, or, to put it in other words, no instantaneous actions at a distance. Of course Einstein was not ready to give up the fundamental principle of locality, which is of fundamental importance in his own theory of relativity. He therefore concluded that quantum mechanics must be incomplete. In 1964, however, John S. Bell, a physicist at CERN, discovered that also a complete quantum mechanics, in its original or other form, exhibits non-local features. Since the 1980s experiments have confirmed the quantum mechanical perspective and it became a well-established fact that reality, at least at the microscopic level, is fundamentally non-local. These results have far reaching consequences not only for our understanding of reality in general, but also with respect to technical applications in quantum cryptography and quantum computing. In this lecture, the speakers will explain what non-locality is, what it means for our understanding of reality and discuss possible practical applications that exploit the phenomenon of non-locality.

In Zusammenarbeit mit der Professur für Philosophie der ETH Zürich. Siehe unter: [blogs.ethz.ch/scienceandphilosophy](http://blogs.ethz.ch/scienceandphilosophy)



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