ICFO COLLOQUIUM MARKUS OBERTHALER 'Quantum Atom Optics: Ocean; Entanglement; Universality; ?'

MARKUS OBERTHALER

March 02, 2018

Friday, March 2, 2018, 12:00. ICFO Auditorium

MARKUS OBERTHALER

Professor, Kirchhoff Institute for Physics, University of Heidelberg$$

Markus Oberthaler studied physics at the University of Innsbruck (Austria), earning his doctorate in 1997. After a two-year research stay at the University of Oxford (Great Britain), in 2000 he became head of an independent junior research group at the University of Konstanz funded through the prestigious Emmy Noether Programme of the German Research Foundation. In 2003, he joined the faculty of Heidelberg University as a professor of experimental physics. He directs the Synthetic Quantum Systems Research Group at the

Kirchhoff Institute for Physics.

The experimental platform of atoms manipulated by light offers answers to a broad spectrum of open questions. With three explicit and very different examples I will give you glimpse how broad this spectrum is. One fundamental question in oceanography is the time when deep water in the ocean was last in exchange with the atmosphere. The possibility to detect Argon 39 atoms one by one allows the dating of water samples as small as ten liters. A very different question in physics is the generation of spatially separated entanglement in atomic gases. I will discuss what strategy allows the production and also the inference of the presence of this kind of entanglement. In the experiment we find that the system generated is at least genuine five-partite entangled. The aspect of studying isolated many body quantum systems with high level of control and for long time offers a path to detect universal time dynamics. Universal meaning, that the evolution does not depend on the initial condition and follows the scaling hypothesis in time and space. The first observation of universal time dynamics in ultracold quantum gases will be present.

Friday, March 2, 2018, 12:00. ICFO Auditorium