ICFO Colloquium MACIEJ LEWENSTEIN & ADRIAN BACHTOLD '2016 Nobel Prize in Physics'

MACIEJ LEWENSTEIN & ADRIAN BACHTOLD

October 24, 2016

Monday, October 24, 2016, 12:00, ICFO's Auditorium
MACIEJ LEWENSTEIN & ADRIAN BACHTOLD
ICFO-The Institute of Photonic Sciences
$$ICREA Prof at ICFO Maciej Lewenstein and ICFO Prof Adrian Bachtold both lead vigorous research programs at ICFO that have a significant overlap with the topic awarded the Nobel Prize.

ADRIAN BACHTOLD 'Topological phase transition in liquid helium'

Prof. Adrian Bachtold will discuss the topological phase transition proposed by Thouless and Kosterlitz for two-dimensional (2-D) liquid helium. I will first recall that the transition between

superfluid and normal fluid in 3-D is related to symmetry breaking. This is very similar to the phase transition between ice and water. In their seminal work, Thouless and Kosterlitz showed that the transition becomes completely different in 2-D. The phase transition becomes continuous and is related to superfluid vortices. I will present the experiments of Bishop and Reppy on 2-D liquid helium, which are consistent with a topological phase transition.

MACIEJ LEWENSTEIN 'Physics and Topology'

Prof. Maciej Lewenstein will remind you some of the great discoveries, for which David Thouless, Michael Kosterlitz and Duncan Haldane were rewarded the Nobel Prize in Physics in this year. Lewenstein will devote most of the time to topology in 2D and the Kosterlitz-Thouless-Berezinskii (KBT) transition. Prof. Maciej Lewenstein will discuss two dimensional materials and vortices, and the, so called, Mermin-Wagner-Hohenberg curse. Lewenstein will give a short crash course on KTB transition. In the second part Lewenstein will focus on systems in strong magnetic fields and time reversal (TR) symmetry breaking. Prof. Maciej Lewenstein will concentrate on paradigm example of Integer Quantum Hall Effect, explain the quantization of the conductivity and relation to topological invariants - Chern numbers. Finally, if time permits I will mention topological insulators that do not require breaking of the TR symmetry. I will mention Haldane model and spin orbit coupling.

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