Loop echo spectroscopy of Anderson localization

By
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Venue: MAS Executive Classroom 2
Host: Assoc. Prof Rainer Dumke

Abstract

We propose a new dynamical framework to study weak localization as well as the onset of Anderson localization in disordered systems [1]. The idea is to expose the waves propagating in a random scattering environment to a sequence of short dephasing pulses. The system responds through coherence peaks forming at specific echo times, each echo representing a particular process of quantum interference. We have suggested a concrete realization for cold gases, where quantum interferences are observed in the momentum distribution of matter waves in a laser speckle potential. Our proposal has been recently realized at Institut d’Optique (Palaiseau, France) in the weak localization regime. The suggested echo protocol should permit to probe also the higher-order processes that are responsible for coherent forward scattering, which has been established as the momentum-space signature of the onset of Anderson localization.

References:

Short Biography

Research

• Quantum transport theory
• Bose-Einstein condensation and superfluidity
• Anderson localization

Curriculum vitae

2014-2015 - Researcher (CNRS) at INLN, U Nice-Sophia Antipolis, Valbonne, France
2013-2015 - Visiting Professor at U Konstanz, Germany
2010-2013 - Visiting Research Associate Professor, Centre for Quantum Technologies, Singapore
2003-2010 – Junior professor at U Bayreuth, Germany
2001-2003 - Guest scientist (postdoc), U Nice - Sophia Antipolis, France, and MPIPKS Dresden, Germany
2001 - PhD in Theoretical Physics, U Nice -Sophia Antipolis, France, and LMU Munich, Germany
1998 - DEA (diploma) de Physique Théorique, ENS and UPMC, Paris, France

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