ICFO



INSIGHT SEMINAR: Dynamics of complex systems through the prism of adiabatic transformations

ANATOLI POLKOVNIKOV

September 26, 2024
15:00 to 16:00
Seminar Room

BIO:

Anatoli Polkovnikov got PhD in 2003 at Yale University under supervision of Prof. Subir Sachdev. He then was employed as a Postdoctoral fellow at Harvard University (2003-2005) and in 2005 he joined Boston University as a faculty member. His work is centered around theory of non-equilibrium quantum and more recently classical systems. In particular, he worked on various aspects of chaos, counter-diabatic driving, theory of Floquet systems, dynamical quantum phase transitions and phase space methods.

ABSTRACT:

Adiabatic transformations show up in many areas of physics from semiclassical Bohr-Sommerfeld quantization to such topics as quantum geometry and construction of

effective low energy models. In this talk I will discuss the definition and some basic properties of the Adiabatic Gauge Potential (AGP)- the generator of such transformation both in quantum and classical Hamiltonian systems. In particular, I will highlight it connection to the low frequency noise. Then I will show how using the concept of the AG allows one to systematically go beyond Born-Oppenheimer approximation naturall separating quantum and classical degrees of freedom. I will also discuss how one can use th notion of adiabatic complexity encoded in the quantum geometric tensor (norm of the AGP) to naturally define chaos, integrability and ergodicity both in quantum and classical systems I will argue that integrable and ergodic/mixing regimes are generically separated by a intermediate KAM-like phase where the adiabatic complexity is maximal and which i characterized by very slow relaxation dynamics. In many-particle systems this phase i usually transient in the thermodynamic limit.

Hosted by: Prof. Dr. Maciej Lewenstein