



# PHYSICS AND ASTRONOMY COLLOQUIUM

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## **"From Quantum Chaos and Eigenstate Thermalization to Statistical Mechanics and Thermodynamics"**

### Abstract

In this talk I will overview recent developments in understanding quantum chaos through random matrix theory. I will discuss various conjectures on the nature of quantum stationary states in chaotic systems and show numerical evidence supporting them. It is the random nature of eigenstates, which ultimately leads to loss of information about initial conditions and leads to emergence of statistical mechanics in isolated systems. I will then introduce the so-called Eigenstate Thermalization Hypothesis (ETH) ansatz first proposed by J. Deutsch and M. Srednicki in 90th, which gives a unified framework for the structure of physical observable in quantum chaotic systems. I will demonstrate how the ETH ansatz naturally leads to emergence of various thermodynamic relations. At the end of the talk I will mention some open problems.

Wednesday, January 10, 2018

3:30 p.m.

BWC Building

Room A104