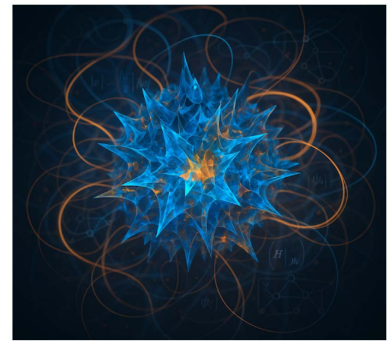


Random Quantum Hamiltonians: Physics, Computation, and Complexity

February 8 - 12, 2027



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Scientific Overview

Disordered models have become the canonical starting point for probing the emergent behavior of many highly complex systems. Originally motivated by the study of magnetism in materials, the theory of disordered systems has blossomed into a unifying and powerful theory spanning physics, mathematics, computer science, statistics, machine learning, and beyond. Random Quantum Hamiltonians are quantum variants of these models that exhibit intriguing phenomena such as quantum chaos, entanglement growth, and holographic dualities, which are largely poorly understood.

This IPAM workshop will convene mathematicians, physicists, and computer scientists to map the state of the art and chart new directions in this field. We hope to formulate open problems in this exciting area and introduce them to the broader community. Core themes include rigorous mathematical understanding of spectral properties, analysis of thermalization, and bridges to holography. These themes will link to computational questions, including the average-case hardness of simulating these systems using either quantum or classical computation, and lead to the formulation of classically-hard problems that are interesting to study using quantum computers.

This workshop will include a poster session; a request for posters will be sent to registered participants in advance of the workshop.

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.

Organizers

Eric Anschuetz (California Institute of Technology)
Anurag Anshu (Harvard University)
David Gamarnik (Massachusetts Institute of Technology)
Bobak Kiani (Bowdoin College)
Alexey Milekhin (California Institute of Technology)
Leo Zhou (University of California, Los Angeles (UCLA))

Speakers

TBA



UCLA



For more information, visit the program webpage:
www.ipam.ucla.edu/RQH2027