Extreme Universe The 19th COLLOQUIUM October 2nd (Mon.) ONLINE

TALK 22:00 - 23:00 (JST)

October 2nd(Mon.) 9:00 - 10:00 (EDT) October 2nd(Mon.) 13:00 - 14:00 (GMT)

ONLINE COFFEE TIME 23:00 - 24:00 (JST)

Registration required (click HERE)

Extreme Universe, JAPAN



Speaker Prof. Brian Swingle

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Brandeis University

Title Hydrodynamics and Random Matrices

Abstract

Many quantum systems exhibit a surprising commonality: their energy levels are statistically similar to the eigenvalues of a random Hermitian matrix. This phenomenon is known as random matrix universality, and it has been observed in systems ranging from nuclei (Wigner's original idea) to quantum materials to black holes (and beyond). The wide-ranging applicability of this idea calls for an equally wide-ranging theory. At the same time, these various physical systems are not literally described by random matrices, so any theory should also be able to compute the limitations of random matrix universality. I will discuss recent work in which we have developed an effective theory of spectral statistics which connects the

statistical properties of energy levels to the thermalization properties of the system, with qualitatively different behaviors depending on whether the system is a fluid or a glass or has a broken symmetry. I will also discuss surprising deviations from random matrix universality that occur at late time and that are connected to properties of the Riemann zeta function and its generalizations.

MEXT -KAKENHI- Grant-in-Aid for Transformative Research Areas (A) The Natural Laws of Extreme Universe -A New Paradigm for Spacetime and Matter from Quantum Information-