

Physics Colloquium

Vladimir Rosenhaus – Institute
for Advanced Study

“Quantum Field Theory, Black Holes, and Chaos”

Quantum field theory is an incredibly rich, versatile, and successful framework that lies at the core of much of particle physics, quantum gravity, and condensed matter physics. Much of our intuition about field theory is built on weak coupling, while some of the most interesting phenomena occur at strong coupling. In recent years it has been realized that quantum black holes are described by quantum field theory at the strongest coupling. Black holes thermalize information faster than any other system and are the most chaotic systems in nature. Attempts to describe black holes have recently led to the discovery of the SYK model, a simple strongly coupled quantum field theory that, remarkably, is both solvable and maximally chaotic. We review these developments, describe some of the myriad applications of the SYK model, and discuss how the SYK model is propelling our understanding of quantum field theory.

Vladimir Rosenhaus received a BS from MIT in 2009 and a PhD from the University of California, Berkeley in 2014. He was then a postdoctoral scholar at the Kavli Institute for Theoretical Physics in Santa Barbara, before becoming a member at the Institute for Advanced Study in Princeton in 2018. His research focuses on the connections between quantum field theory and gravity.

Physics Faculty and Search Committee Candidate

****Tuesday, February 5th in LL 316 at 4:10**

Refreshments available at 3:45