IST AUSTRIA
Institute of Science and Technology

Physical Sciences Seminar

[Webinar] Phase transitions in the dynamics of quantum information

Soonwon Choi (UC Berkeley)

Host: Maksym Serbyn

Quantum information science seeks to understand and control quantum systems with high entanglement and complexity, defining a new frontier of physics. In this talk, we discuss a novel phenomenon that arises in this regime: a phase transition in the dynamics of quantum entanglement and information. We consider a generic quantum many-body system coupled to a noisy environment, which we model with random unitary circuits interspersed with projective measurements. The interplay between unitary evolution and measurements leads to a sharp phase transition: at high measurement rates, any coherent information in the system is completely lost, while at sufficiently low rates, an extensive amount of information is robustly protected. The nature of the phase transition can be understood from two complementary perspectives based on quantum information theory and classical statistical mechanics. As applications of our work, we develop a novel way to probe quantum chaos, quantitatively examine Google's recent test of quantum supremacy, and shed light on the computational complexity of simulating quantum dynamics.

Tuesday, April 7, 2020 05:00pm - 07:00pm

IST Austria Campus Webinar

This invitation is valid as a ticket for the IST Shuttle from and to Heiligenstadt Station. Please find a schedule of the IST Shuttle on our webpage: https://ist.ac.at/en/campus/how-to-get-here/ The IST Shuttle bus is marked IST Shuttle (#142) and has the Institute Logo printed on the side.