



LABORATORY FOR ELEMENTARY-PARTICLE  
PHYSICS (LEPP)

# Theory Seminar

**Ahmed Almheiri**  
**IAS**

**An Investigation into  
Evaporating Eternal Black  
Holes**



An eternal black hole is often considered as a toy model for an old black hole that is entangled with its early radiation, and is the inspiration for the notion that there should exist a geometric connection between the two. Starting with two CFTs in the thermofield double state dual to the eternal black hole in AdS, I will discuss a bulk picture for how information injected into the bulk from one boundary becomes reconstructable from the other in response to extracting energy from the former and inserting it into the latter. This process can be described as 'evaporating one CFT into the other'. I will then discuss a concrete analysis of the evaporation process by considering the SYK model, whose bulk dual contains dilaton-gravity in 1+1 dimensions. By coupling two SYK systems at different temperatures, I will analyze the dynamics of the energy and the effective temperature of the system as a function of time and the size of the coupling between the two. I will also present a new bound on the energy flux of any system, which is then related to bulk causality in the holographic context, and show how it is satisfied within the SYK evaporation model

**Wednesday, March 27, 2019**  
**2:00pm**  
**401 Physical Sciences Building**