High Energy Physics Colloquia

17 maggio 2017 · ore 15:00 · aula C

Matteo Ciulu

Cagliari U.

Statistical Black Hole Entropy and AdS$_2$/CFT$_1$

Abstract

One of the major challenge in theoretical physics is to find a quantum gravity theory. An attempt in this direction is the gauge/gravity duality (also known as AdS/CFT duality), proposed by Maldacena. It is a correspondence between a gravity theory in $D+1$ dimensions and a quantum field theory in D dimensions. Thus it is a realization of holographic principle useful to study black holes. Since the discover that black holes behave as thermal objects, an open question has been whether black hole thermodynamics has a statistical mechanical description in terms of microscopic states. An answer could shed light on quantum gravity or at a minimum, black hole thermodynamics provides an important check for any candidate theory. Strominger, using CFT methods and the seminal work of Brown and Henneaux about asymptotic symmetries, observed that the Cardy formula reproduce Bekenstein–Hawking entropy.

In this talk, after a brief review about these topics, I will present a black hole model in two dimensions. Starting with the study of asymptotic symmetries of AdS$_2$ I will show that it is possible to calculate the statistical entropy in terms of dual CFT using a boundary realization of these symmetries. Moreover I will discuss how some features of the boundary theory (which can be described by a Schwarzian action) are related to those symmetries.