

Introduction to the AdS/CFT Duality (E16)

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Non-Examinable (Part III Level)

— *Non-Examinable*

AdS/CFT is an amazing duality that relates certain theories of quantum gravity (with a negative cosmological constant) to ordinary quantum field theories living in a smaller dimensional spacetime. This is the most precise known realization of the holographic principle, the idea that all information in the universe is encoded somehow at the boundary of the universe. These lectures will describe in detail the “dictionary” used to relate observables on the bulk side to observables on the boundary side. Special attention will be given to the holographic entanglement entropy formula of Ryu and Takayanagi, and the information puzzle for black holes.

Pre-requisites

You should be familiar with quantum field theory, general relativity, and black holes. Basic exposure to quantum information theory and string theory may also be useful.

Although most known forms of AdS/CFT rely on supersymmetry, this aspect will not be heavily emphasized in these lectures.

Literature

TBD