PHYS-739

Conformal Field theory and Gravity

Guica Monica Maria

Cursus	Sem.	Type
Physics		Opt.

Language of teaching	English
Credits	4
Session	
Exam	Oral
Workload	120h
Hours	**56**
Courses	28
Exercises	28
Number of positions	

Frequency

Every year

Remark

Next time: Fall

Summary

This course is an introduction to holography, the modern approach to quantum gravity.

Content

1. Motivation from black hole thermodynamics
2. The very basics of string theory
3. Statement of the correspondence (discussion of the decoupling limit)
4. A basic introduction to CFT and to the geometry of AdS
5. Computing correlation functions (time permitting: holographic renormalization, real time, finite temperature)
6. Entanglement and the emergence of gravity (time permitting)
7. Beyond AdS/CFT: non-conformal and other backgrounds

Keywords

gauge/gravity duality

Learning Prerequisites

Required courses

Quantum Field Theory, General Relativity

Recommended courses

Quantum Field Theory, General Relativity
Advanced Quantum Field Theory, Gauge Theories and the Standard Model

Learning Outcomes

By the end of the course, the student must be able to:

- Understand the AdS/CFT correspondence and its implications for Quantum Gravity
- Perform and explain calculations in CFT and Gravity

Teaching methods

Black board lectures and problem solving sessions.

Expected student activities

Attendance of lectures and problem solving sessions. Critical study of the material.

Assessment methods

Indicidual project and oral exam.

Resources

Bibliography

Slava Rychkov, lectures notes on CFT, http://arxiv.org/abs/1601.05000
David Simmos-Duffin, lecture notes on CFT, http://arxiv.org/abs/1602.07982
Joao Penedones, lecture notes on AdS/CFT, https://arxiv.org/abs/1608.04948

Moodle Link

- https://go.epfl.ch/PHYS-739