Curricular Unit

Advanced Physics Topics 1

Module

Introduction to String Theory (IST)

Type

Tutorial: Reading and Study assignment

Contact hours

18

Professor/Researcher in charge

João Penedones , U. Porto

Summary of Contents

The course in based on a set of online lectures of Perimeter institute, which will be attended by the students and professors in charge, complemented by discussions and problem sessions. The topics are:

Lecture 1 - Review of Relativity, Light cone coordinates, Compactification
Lecture 2 - Orbifolds, Nonrelativistic sting, Relativistic point particle
Lecture 3 - Relativistic strings, Nambu-Goto action
Lecture 4 - Boundary conditions: D-branes, Static gauge, String in rest, Transverse velocity
Lecture 5 - String parametrization, equations of classical motion and constraints
Lecture 6 - Symmetries and conserved momentum and Lorentz charges. general gauges.
Lecture 7 - Equations of motion for free open strings, light-cone solutions, Virasoro operators.
Lecture 8 - Light cone fields, Point particle quantization
Lecture 9 - Quantization of point particle in light cone gauge, Momentum and Lorentz generators
Lecture 10 - Quantization of an open string I
Lecture 11 - Quantization of an open string II: critical dimension, tachyon, Maxwell field
Lecture 12 - Quantization of a closed string; Virasoro operators, graviton, dilaton
Lecture 13 - Strings on R^1/Z_2 orbifold. Action for fermionic strings.
Lecture 14 - Quantizing superstrings: NS and R sectors, Spacetime fermions.
Lecture 15 - Overview of superstring theories, D-branes

References

http://perimeterscholars.org/413.html

Evaluation

Problems solved and presented by the students during the course.

Juri

Miguel S Costa, João Penedones, [Complete]