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 is 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 string, 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

MAP-fis Physics Doctoral Program – mapfis@map.edu.pt – http://www.map.edu.pt/fis
Departamento e Física e Astronomia, Faculdade de Ciências da Universidade do Porto, 4169-007 Porto
Portugal - Tel: +351 220402393
Evaluation

Problems solved and presented by the students during the course.

Juri

Miguel S Costa, João Penedones, [Complete]