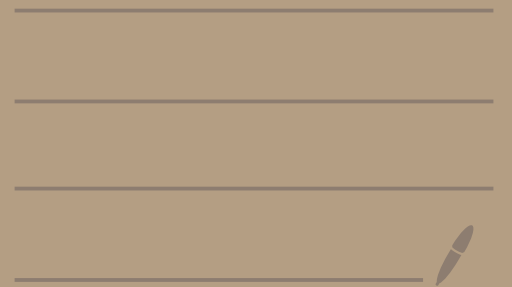


STRING THEORY I

TABLE OF CONTENTS

lectures 1-11



1

Introduction

- 1.1 What is string theory?
 - 1.2 Historical introduction
- } lecture 1

12] Classical relativistic theory

- 2.1 Classical point particle
 - 2.2 Classical relativistic string
 - 2.3 Classical solutions
 - 2.3.1 Equations of motion & boundary conditions
 - 2.3.2 Conserved charges
 - 2.3.3 Witt algebra & conformal symmetries
- } Lecture 2
- } Lecture 3
- } Lecture 4

13] Old covariant quantization

Hilbert space (without constraints)

Normal ordering

Virasoro algebra

Constraints and ϕ phys

Mass shell & level-matching condition
level 0 & 1 states; dealing with ghosts

ϕ phys, spurious states, null states, ghosts

Critical dimension

No ghost theorem for $1 \leq D \leq 25$, $a \leq 1$

Physical states for the closed string (level 0 & 1)

(Appendix: light-cone quantization
Open string at level 2)

Lecture
5

Lecture
6

Lecture
7

4 Interactions

4.1 Generalities

4.2 Vertex operators: introduction

4.3 Vertex operators: open string & tachyons

open string levels 1 & 2

4.4 The state vertex correspondence open strings

closed strings

4.5 3-point interactions

4.6 4-point tachyon amplitude

4.7 Comments on the general picture

lecture
8

lecture
9

lecture 10

lecture 11

5 Strings in background fields

5.1 Background field expansion and the Weyl anomaly

5.2 Including other massless fields
(B & Φ)

5.3 Space-time effective action

5.4 The dilaton revisited

5.5 Energy scales

} Lecture 12

} Lecture 13

6

Compactifications

- 6.1 Compactifications on a circle from EFT perspective (Closed strings)
- 6.2 Compactifications on a circle from CFT perspective (Closed strings)

Lecture 14