

Title: String Theory Lecture

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Collection: String Theory 2023/24

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URL: <https://pirsa.org/24040034>

$$A_T = \prod_{v \in \text{VERTICES}} \prod_{e \in \text{EDGES}} G(x_{e(v)} - x_{e(w)})$$

$$\prod_{v \in \text{VERTICES}} \frac{d(v)}{2}$$


 $G = \int (x - x')$

$$\frac{h_2}{h_1} = t$$

\mathbb{P}
VERTICES

∂x^{μ}



$$\frac{l_e}{l_1} = t_e$$

$$G(x, x') = \int_0^{\infty} dl l^{-\frac{D}{2}} e^{-\frac{(x-x')^2}{4l}}$$

$$S(x(t)) = -m \int \sqrt{\frac{dx^{\mu}}{du} \frac{dx_{\mu}}{du}} du$$

$$\int \frac{Dx \mathcal{L} e^{-S}}{DIFF} = \int_0^1 (e^{-1}(u) \left| \frac{dx^{\mu}}{du} \right|^2 + m^2 e(u))$$

GAUGE-FIX

$$\int_0^1 \left(\left| \frac{\partial x^{\mu}}{\partial u} \right|^2 + m^2 \right) du$$

$$G(x, x') = \int_0^\infty dl l^{-\frac{D}{2}} e^{-\frac{(x-x')^2}{4l} - l m^2}$$

NR
 $G(x, x'; t)$
 $e^{-\frac{(x-x')^2}{2t}}$

$$S(x(t)) = -m \int \sqrt{\frac{dx^{\mu}}{du} \frac{dx_{\mu}}{du}} du$$

$$v \rightarrow f(v)$$

$$e \rightarrow e \left(\frac{df}{dv} \right)^{-1}$$

DIFF $\int_0^1 dx \rho e^{-S}$

$$\int_0^1 \left(e^{-1}(v) \left| \frac{dx^{\mu}}{du} \right|^2 + m^2 e(v) \right) du \quad \int_0^1 e du = e$$

GAUSSFIX

$$\int_0^e \left(\left| \frac{\delta x^{\mu}}{\delta} \right|^2 + m^2 \right) \delta u$$

D=26

$$S(x^\mu(u, v^i)) = T \int \sqrt{\det \frac{dx^\mu}{du^a} \frac{dx^\nu}{dv^b}} du^1 du^2$$

$2(n+3g-3)$
 d COMPLEX STRUCTURE
 $\int \frac{Dx \cdot Dh}{DIF \cdot XUE \cdot L} - e$

$$u^a \rightarrow f^a(u^1, u^2)$$

$$\frac{T}{2} \int \sqrt{h} h^{ab} \frac{dx^i}{du^a} \frac{dx^j}{dv^b} du^1 du^2$$

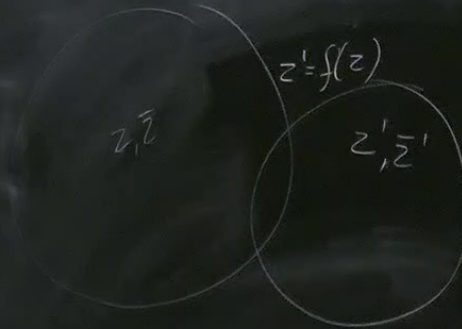
$h_{ab} \rightarrow e^{\phi(u^1, u^2)}$
 $\int \frac{dx^i}{du^a}$

LOCALLY

$h_{ab} \xrightarrow{\text{DIFFERENTIAL}}$

g_{ab}

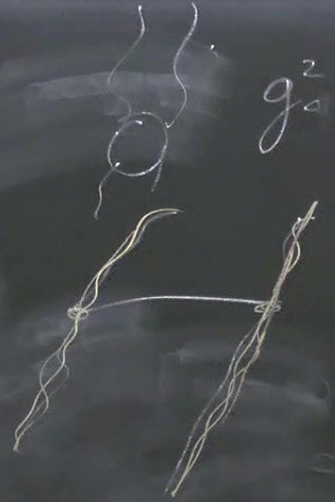
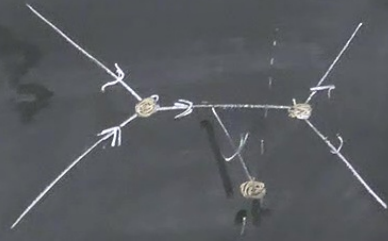
$$ds^2 = dz d\bar{z}$$



$$h_{ab} \rightarrow e^{\phi(u, v^2)} h_{ab}$$

ds^2 locally

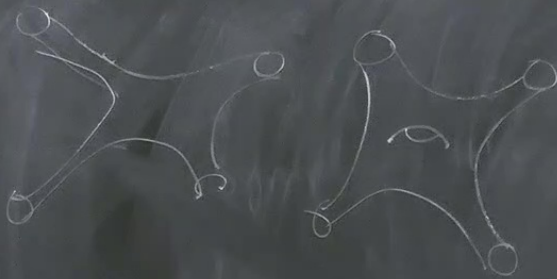
$$\int \frac{ds^2}{dx^a} \frac{dx^a}{dt} dt$$



$$S(\phi) = \int (\dots) \phi(x) + \phi \square \phi + \phi^3 \dots$$

$$\int \dots \chi(s) A_\mu(\chi(s)) ds + \int \dots + \int \dots$$

$$\frac{S_0}{g^2} + S_1 + S_2 g^2 + \dots$$



$$S_{\text{eff}} \sim \frac{S_0}{g^2} + S_1 + S_2 g^2 + \dots$$

$$S_{\text{eff}} \sim g$$



OPEN-CLOSED DUALITY

ST + N D-BRANES

↓ LARGE N
 $g \rightarrow 0$ N
 $g N = \lambda$

ST'