Title: String Theory Lecture

Speakers: Davide Gaiotto

Collection: String Theory 2023/24

Date: April 05, 2024 - 10:15 AM

URL: https://pirsa.org/24040034

$$A_\Gamma = \int_{\text{VERTICES}} \prod_{e \in \text{EDGES}} G\left(x_{e(0)} - x_{e(1)}\right) \prod_{v \in \text{VERTICES}} d^D x_v$$

$$(\Box^2 + m^2)\, G = \delta(x - x')$$

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

$\prod d^D x_v$

VERTICES

x x'

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

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

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

$$\int \frac{Dx \, De}{\mathrm{DIFF}} e^{-S}$$

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

GAUGE-FIX

$$\int_0^l \left(\left| \frac{dx}{d\ell} \right|^2 + m^2 \right) du$$

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

NR

$G(x,x';t)$

$$e^{\frac{i(x-x')^2}{2t}}$$

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

$u \to f(u)$

$e \to e\left(\frac{df}{du}\right)^{-1}$

$$\frac{\int Dx\, De \, e^{-S}}{\text{DIFF}}$$

$$\int_0^1 \left(e^{-1}(u) \left|\frac{dx^i}{du}\right|^2 + m^2 e(u) \right) du \qquad \int_0^1 e\, du = l$$

GAUGE-FIX

$$\int_0^l \left(\left|\frac{dx}{du}\right|^2 + m^2 \right) du$$

$$S\left(x^\mu(\upsilon^1,\upsilon^2)\right) = T\int \sqrt{\det_{a,b}\frac{\partial x^\mu}{\partial \upsilon^a}\frac{\partial x_\mu}{\partial \upsilon^b}}\; d\upsilon^1 d\upsilon^2$$

$$\Uparrow$$

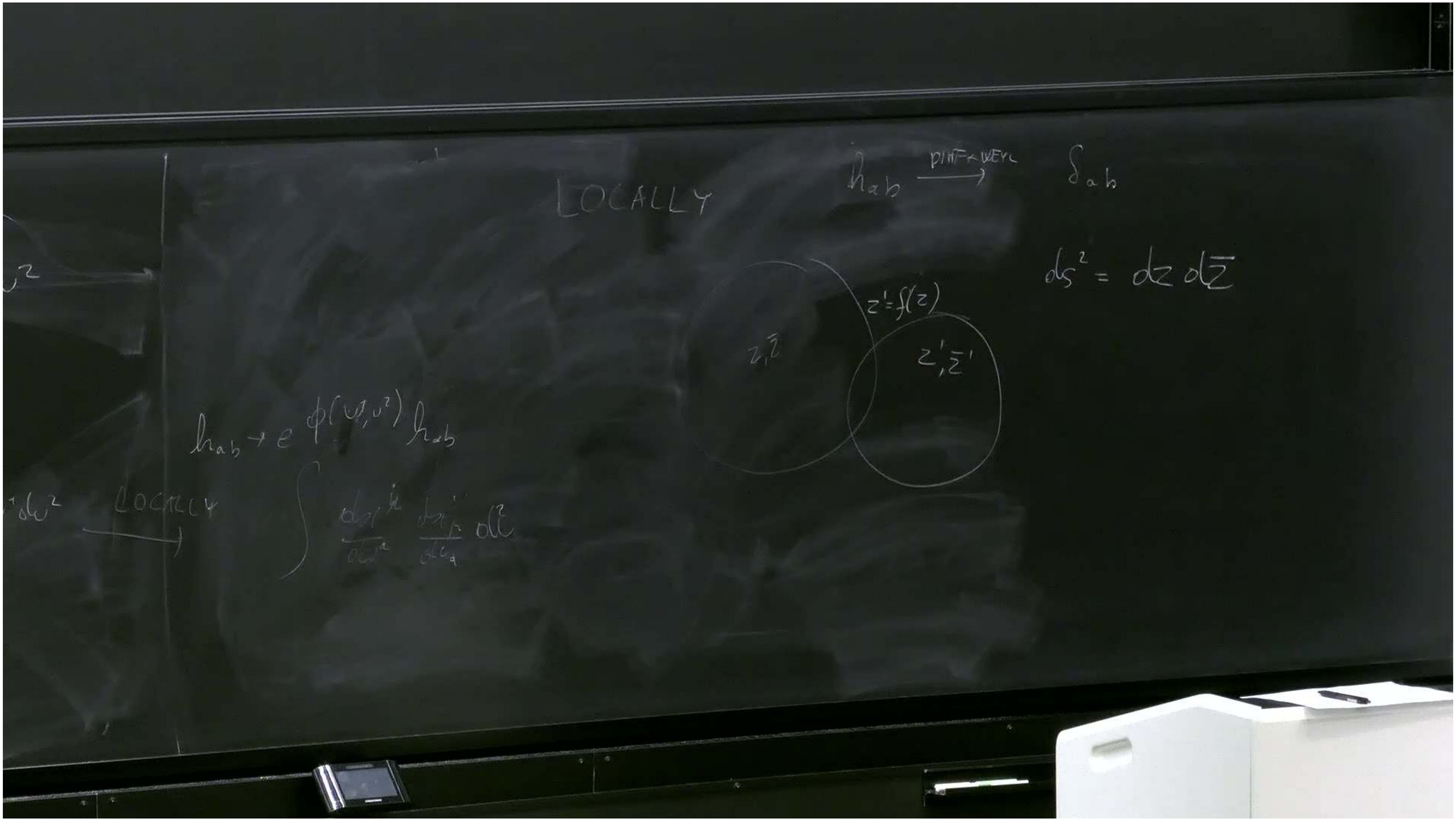
$$\frac{T}{2}\int \sqrt{h}\; h^{ab}\,\frac{\partial x^i}{\partial \upsilon^a}\frac{\partial x_i}{\partial \upsilon^b}\, d\upsilon^1 d\upsilon^2 \xrightarrow{\text{LOCALLY}} \int \frac{\partial x^i}{\partial \upsilon^a} \cdots$$

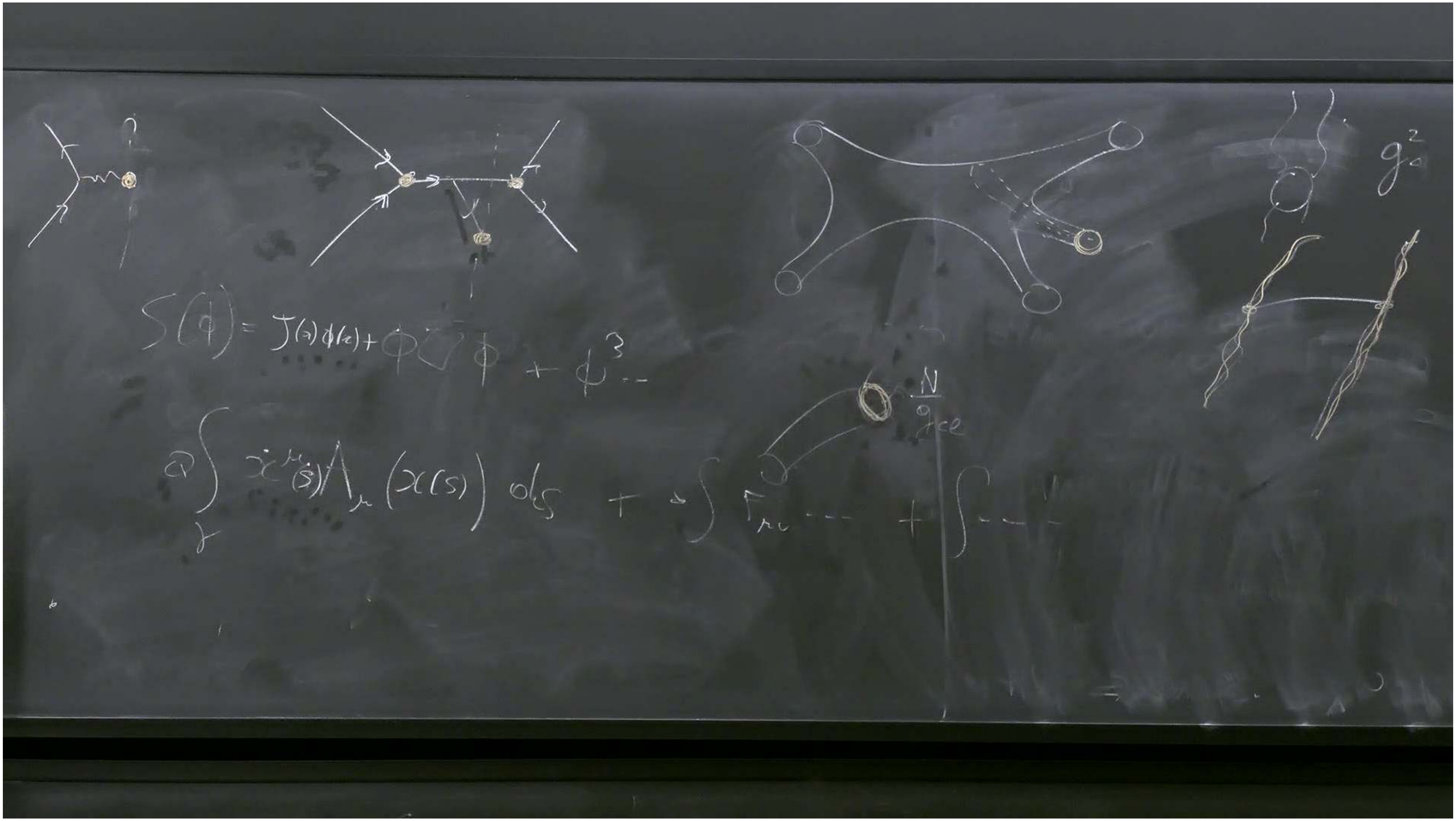
$$h_{ab} \to e^{\phi(\upsilon^1,\upsilon^2)} \cdots$$

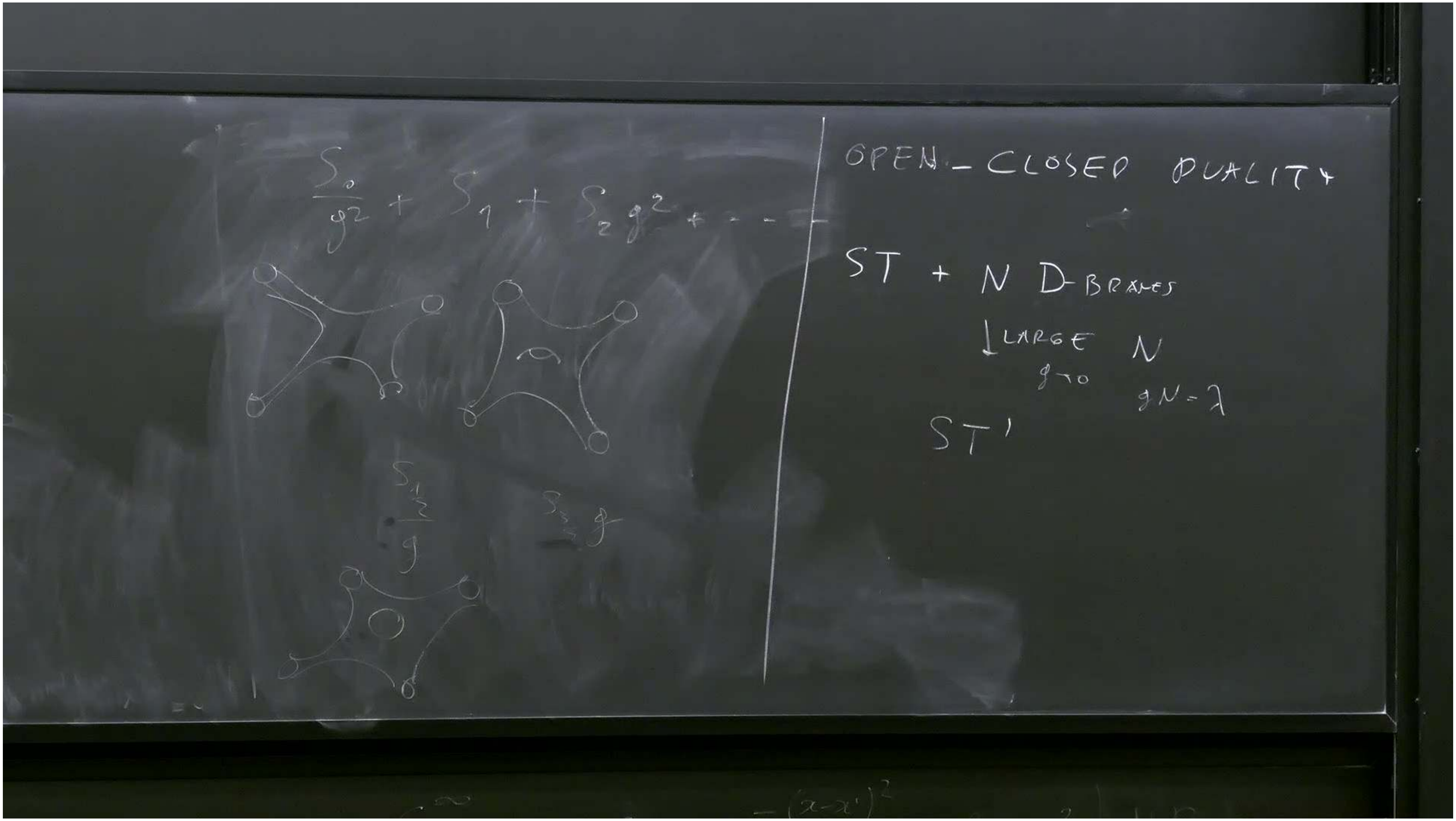
D=26

$$\int \frac{Dx\,\cancel{Dh}}{\mathrm{DIFF}\times \mathrm{WEYL}}\, e^{-S} = \int d^{2(n+3g-3)}\,\text{COMPLEX STRUCTURE}\; e^{-S}$$

$$\upsilon^a \to f^a(\upsilon^1,\upsilon^2)$$


LOCALLY
DIFF × WEYL
ds² = dz dz̄
z' = f(z)
z, z̄
z', z̄'
LOCALLY


S(φ) = J(x)φ(x) + φ□φ + φ³ --
e∫ ẋ^μ(s) A_μ (x(s)) ds + ∫ F_μν --- + ∫ ---
g²


$\frac{S_0}{g^2} + S_1 + S_2 g^2 + \ldots$
OPEN - CLOSED DUALITY
ST + N D-BRANES
LARGE N
$g \to 0$
$gN = \lambda$
ST'