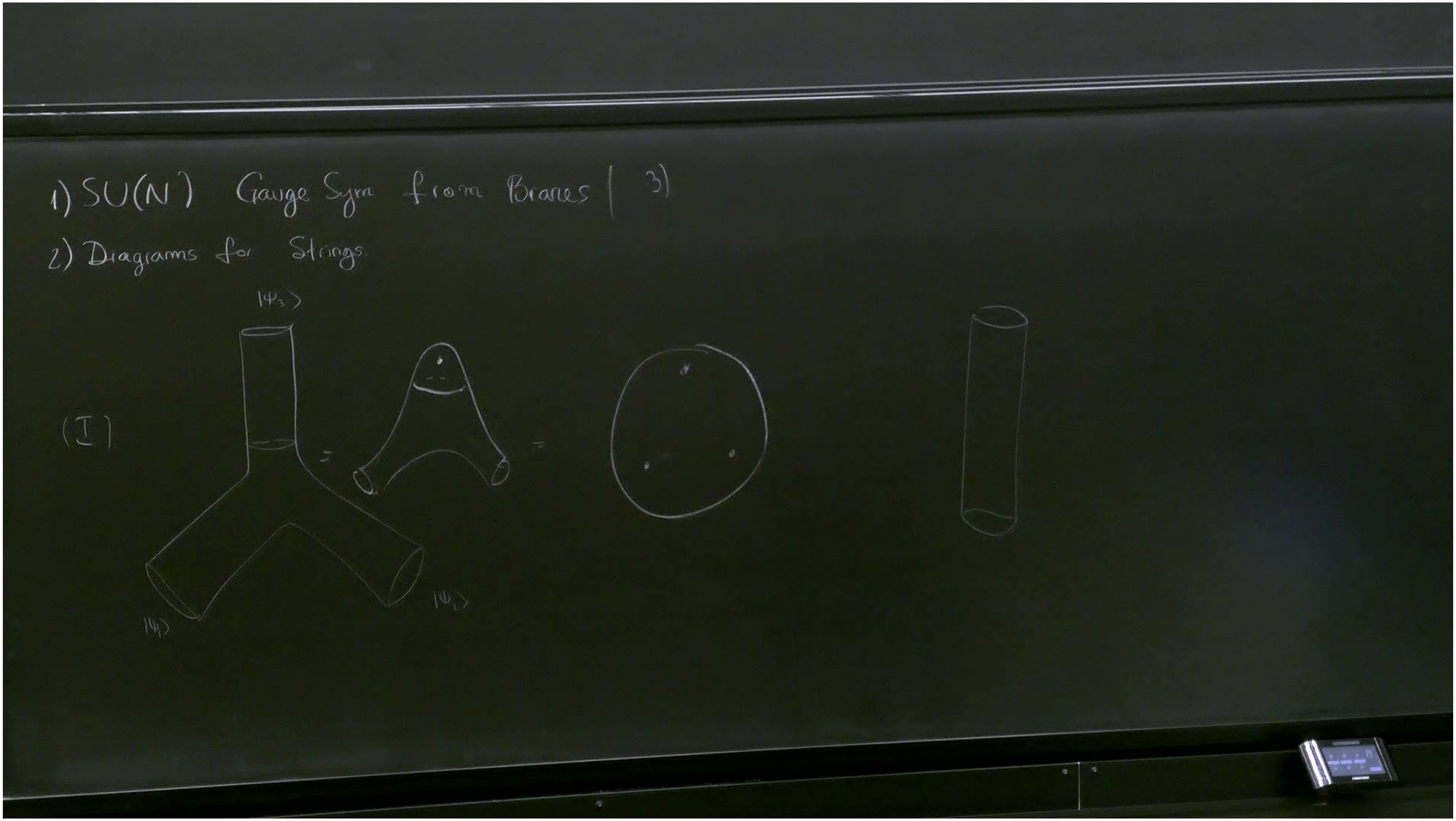
Title: String Theory Course Q&A

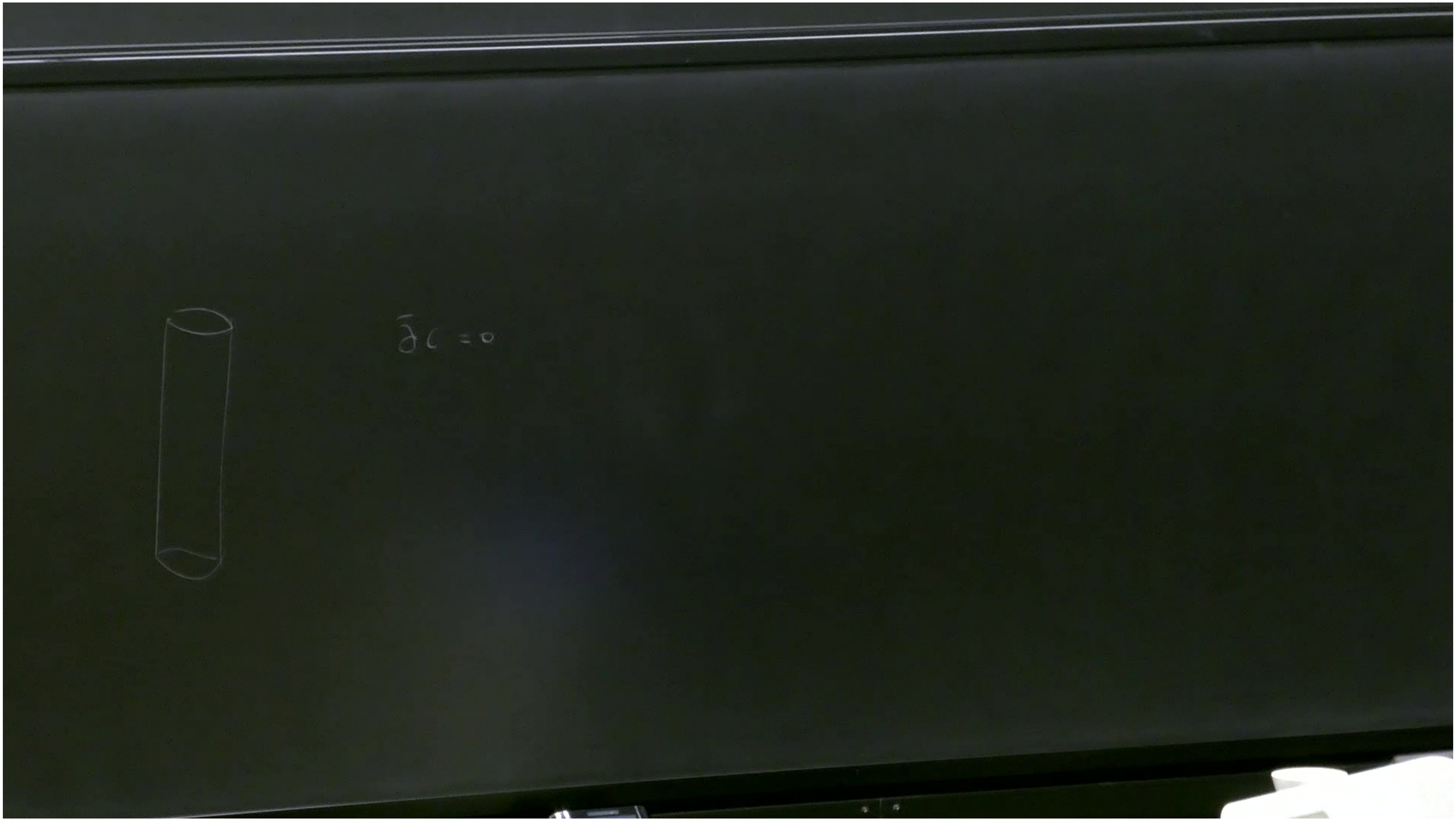
Speakers:

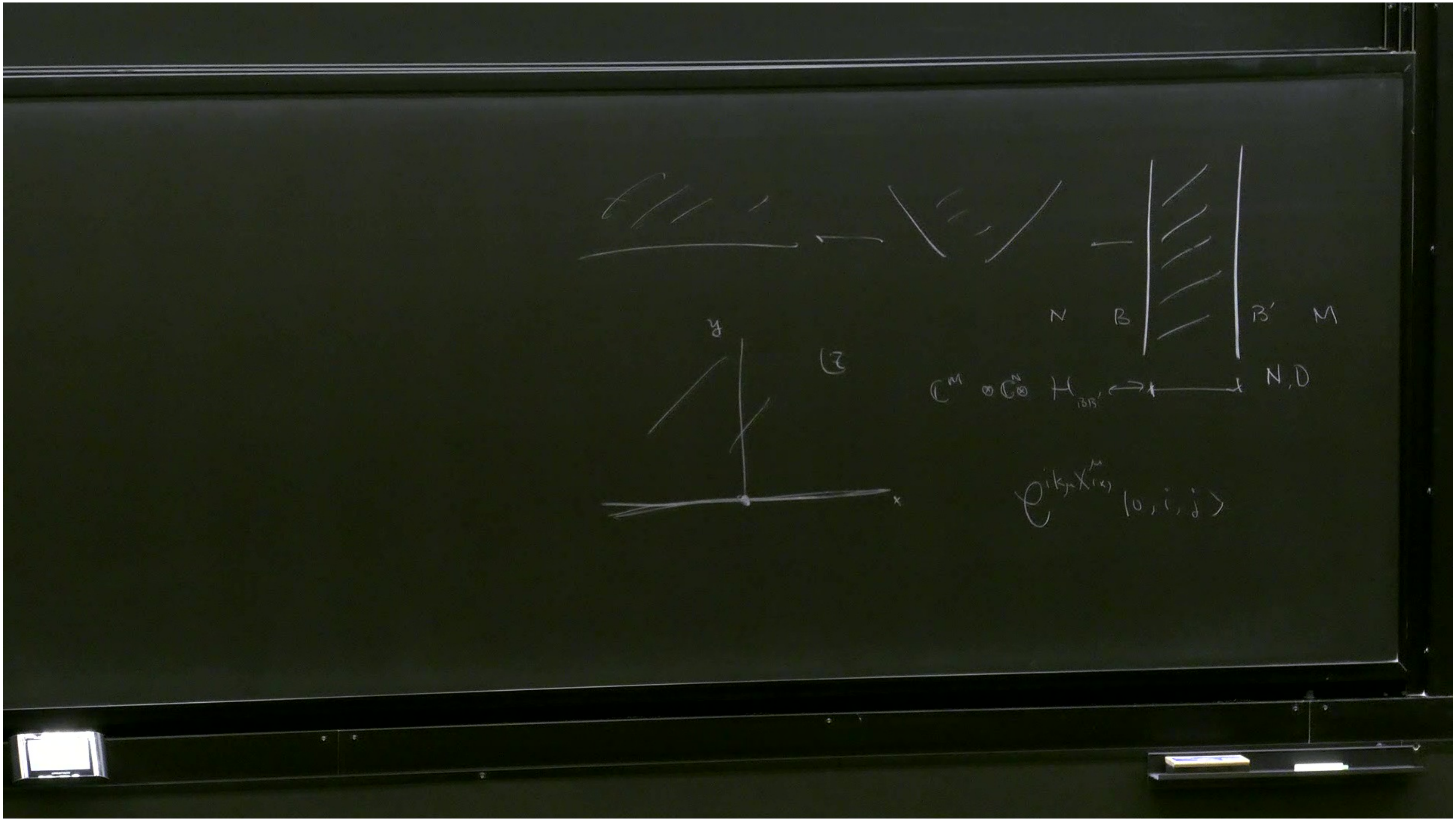
Collection/Series: String Theory Course

Date: May 26, 2025 - 9:00 AM

URL: https://pirsa.org/25050007

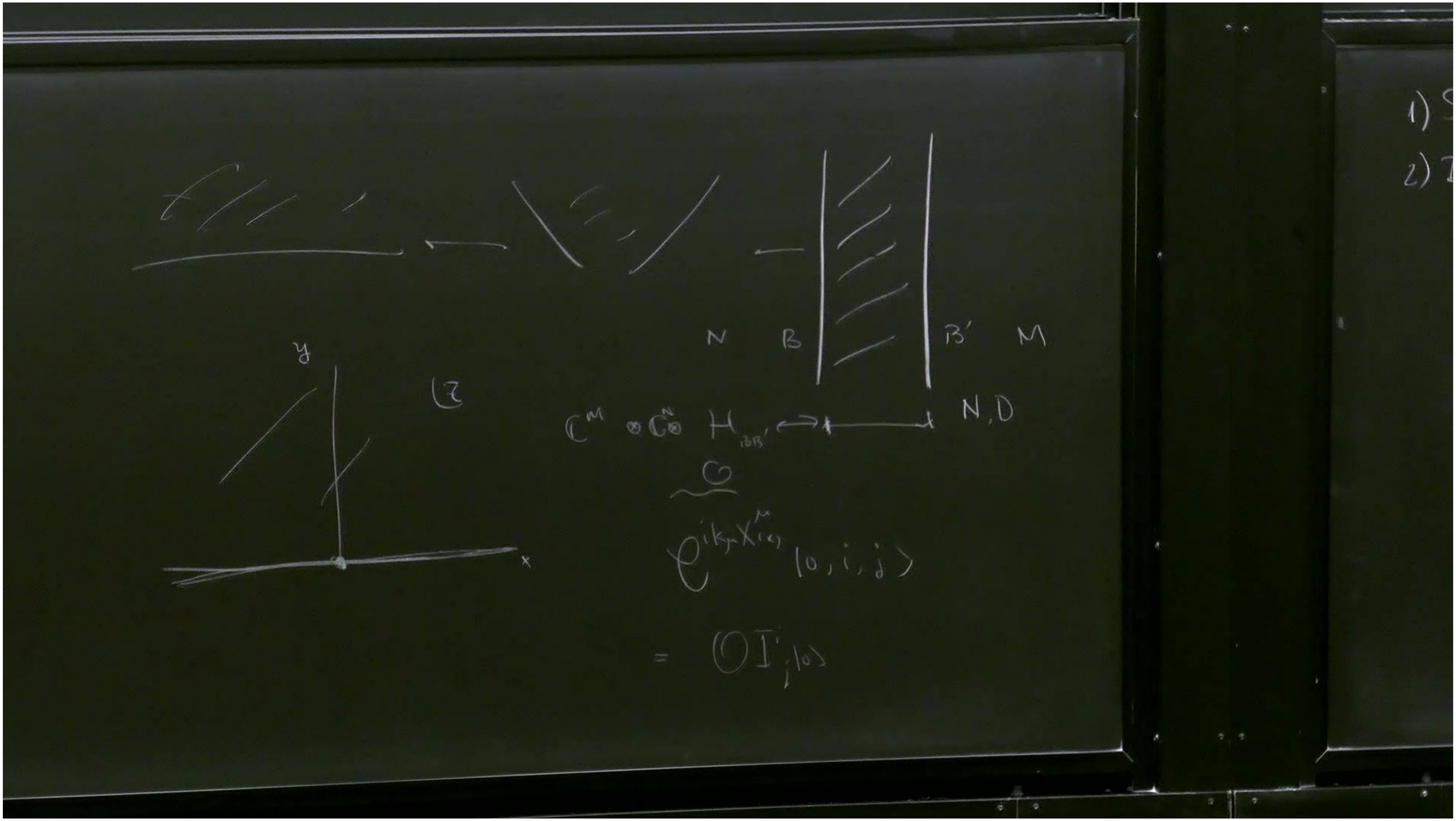

1) SU(N) Gauge Sym from Branes | 3)
2) Diagrams for Strings
$|\Psi_3\rangle$
(I)
=
=
$|\Psi_2\rangle$
$|\Psi_1\rangle$


$\bar{\partial} c = 0$


y
x
N
B
B'
M
N,D
$\mathbb{C}^M \otimes \mathbb{C}^N \otimes H_{BB'}$
$e^{ik_\mu X^\mu(\sigma)} |0, i, j\rangle$

$$e^{-S_0 + \int dz\, d\bar{z}\, \mathcal{O}(z,\bar{z})}$$

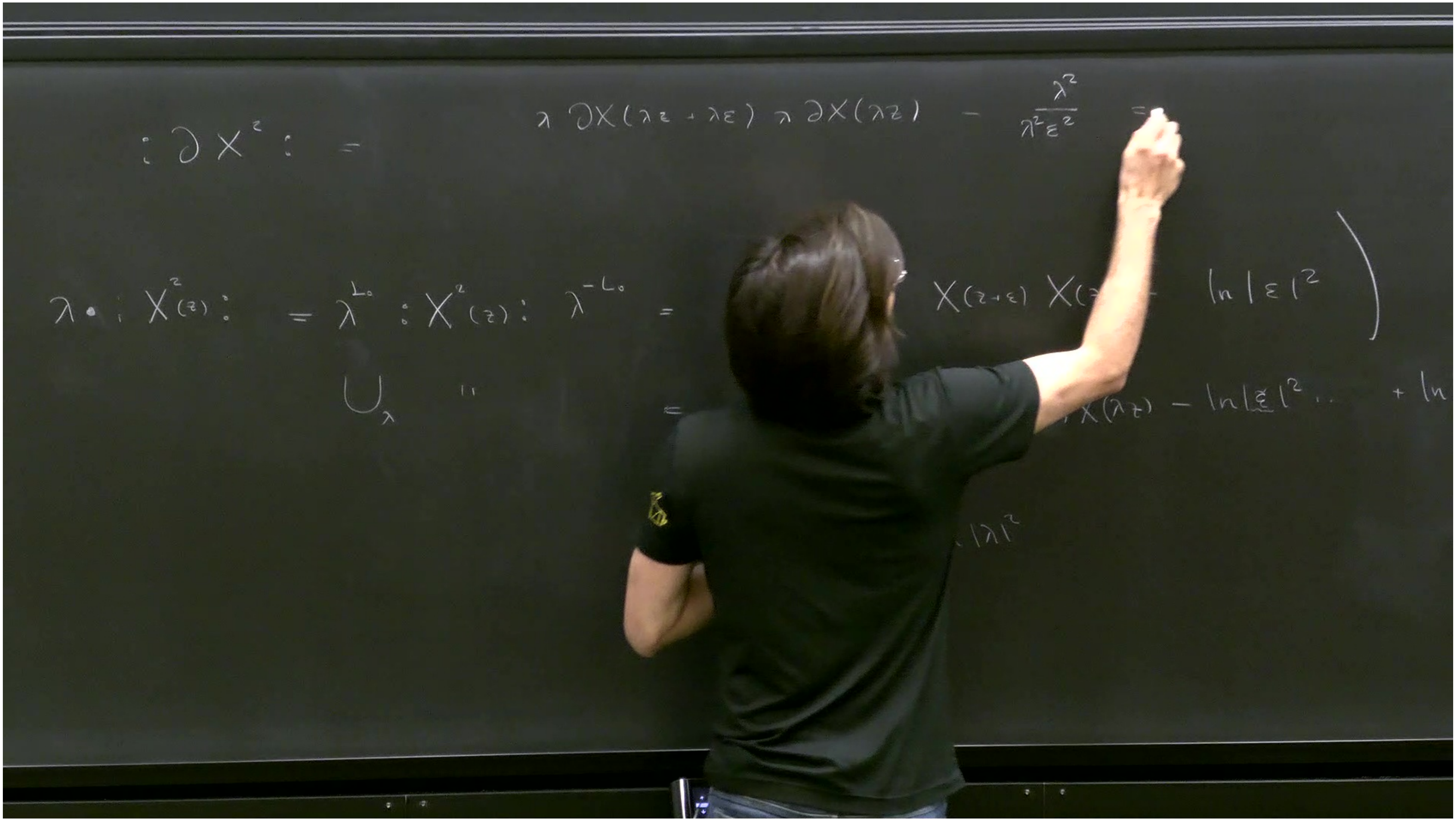
$$\simeq e^{-S_0}\left(1 + \int d^2z\, \mathcal{O} + \cdots \right)$$


N
B
B'
M
y
x
N,D
ℂ^M ⊗ ℂ^N ⊗ H_BB'
|0, i, j⟩
1)
2)

$$:X^2(z): \lambda^{-L_0} = \lambda \cdot \left(\lim_{\varepsilon \to 0} X(z+\varepsilon)\, X(z) - \ln|\varepsilon|^2 \right)$$

$$\quad = \lim_{\substack{\varepsilon \to 0 \\ \varepsilon = \tilde{\varepsilon}/\lambda}} X(\lambda z + \tilde{\varepsilon})\, X(\lambda z) - \ln|\tilde{\varepsilon}|^2 \ldots \quad + \ln|\lambda|^2$$

$$= \, :X^2(\lambda z): \; + \ln|\lambda|^2$$


:∂X²: =
λ ∂X(λz + λε) λ ∂X(λz) − λ²/(λ²ε²) =
λ• :X²(z): = λ^{L₀} :X²(z): λ^{−L₀} =
X(z+ε) X(z … − ln|ε|²
U_λ
X(λz) − ln|ε|² … + ln
|λ|²

$$\lambda\, \partial X(\lambda z + \lambda \varepsilon)\, \lambda\, \partial X(\lambda z) - \frac{\lambda^2}{\lambda^2 \varepsilon^2} = \lambda^2 : \partial X^2(\lambda z):$$

$$= \lambda^{L_0} : X^2(z): \lambda^{-L_0} = \lambda \cdot \left(\lim_{\varepsilon \to 0} X(z+\varepsilon)\, X(z) - \ln|\varepsilon|^2 \right)$$

$$U_\lambda \quad '' \quad = \lim_{\substack{\varepsilon \to 0 \\ \varepsilon = \frac{\varepsilon}{\lambda}}} X(\lambda z + \varepsilon)\, X(\lambda z) - \ln|\varepsilon|^2 \ldots + \ln|\lambda|^2$$

$$= : X^2(\lambda z): + \ln|\lambda|^2$$

$$\lambda \cdot : \frac{X^4}{4!}(z): = \frac{1}{4!} : X^4(\lambda z): + \# \ln|\lambda|^2 : X^2(\lambda x):$$

1) (

2) D

$\int_{\Sigma}$ $\int_{2\Sigma}$

$$\left\langle e^{\int \overbrace{R\, X X \partial X \partial X}^{I}} \cdots \right\rangle$$

$$1 + \int R{:}X X \partial X \partial X{:} + \int {:}I{:}\,{:}I'{:}\, dz\, dz'$$

ym from Branes | 3)

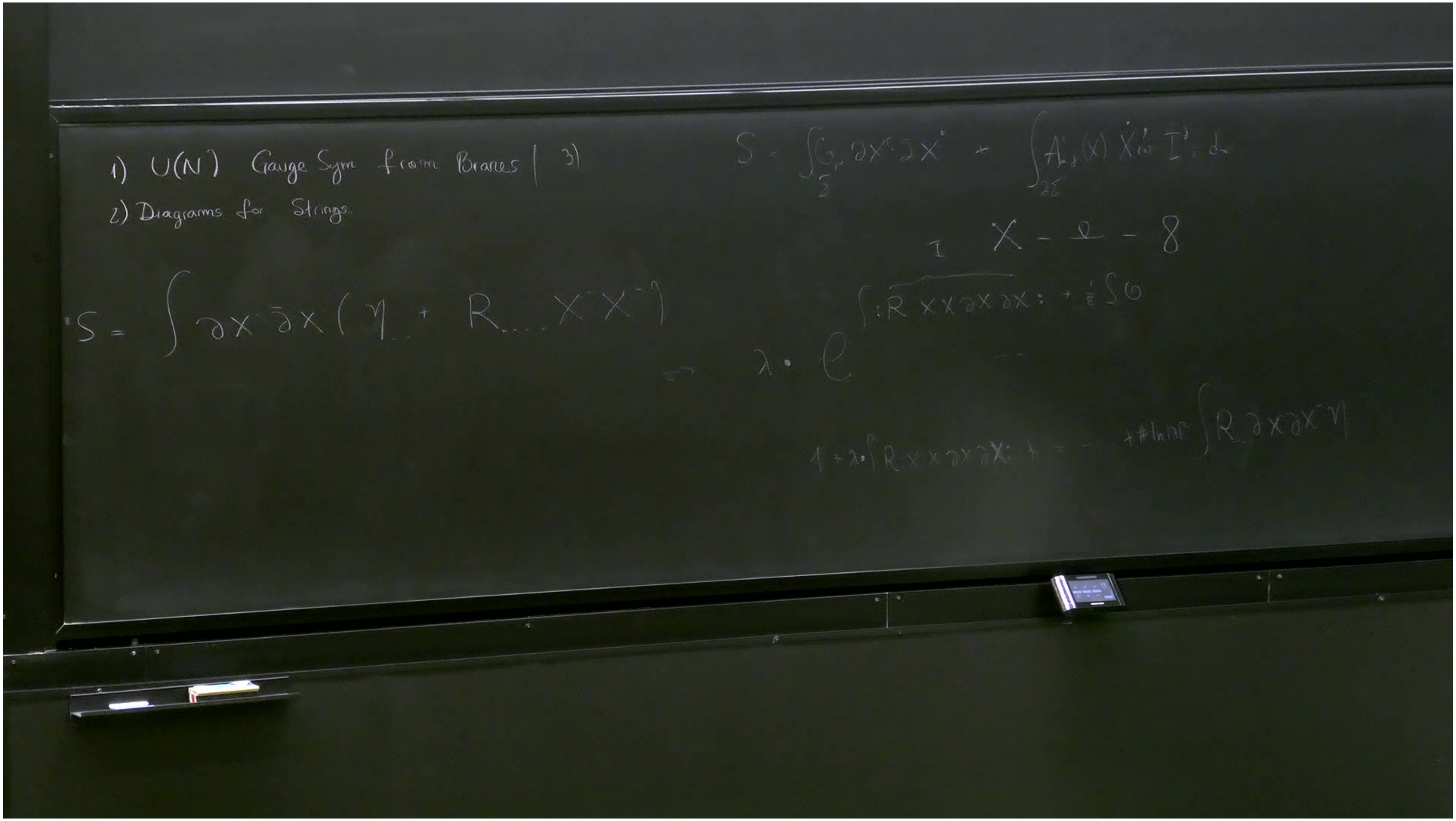
gs:

$$S = \int_{\Sigma} G_{\mu\nu}\, \partial X^{\mu} \partial X^{\nu} + \int_{\partial\Sigma} A^{i}_{\mu j}(X)\, \dot{X}^{\mu}(\tau)\, I^{j}{}_{i}\, d\tau$$

$$(\eta_{..} + R_{....} X^{\cdot} X^{\cdot})$$

$$\Rightarrow \left\langle e^{\overbrace{\int :R\, X X \partial X \partial X:}^{I}} \cdots \right\rangle$$

$$1 + \int R : X X \partial X \partial X : + \int_{\tau \in \partial\Sigma} \omega : I : : I : \, d\tau\, d\tau'$$


1) U(N) Gauge Sym from Branes | 3)
2) Diagrams for Strings
S = ∫ ∂X ∂X (η + R... X X)
S = ∫_Σ G ∂X ∂X + ∫_∂Σ A(X) Ẋ I dτ
X - e - 8
λ · e^{∫ :R X X ∂X ∂X: + ...}
1 + λ∫ R X X ∂X ∂X: + ... + # ln Λ ∫ R ∂X ∂X η

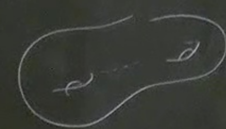
$= \lambda^2 : \partial X^2(\lambda z) :$

$$e^{-\frac{1}{g^2}\int F^2}$$

$z) - \ln|\varepsilon|^2 \Big)$

$X(\lambda z) - \ln|\varepsilon|^2$

$$A_n = \sum_{n_g} g^{n_g} \underbrace{A_{n,g}}$$



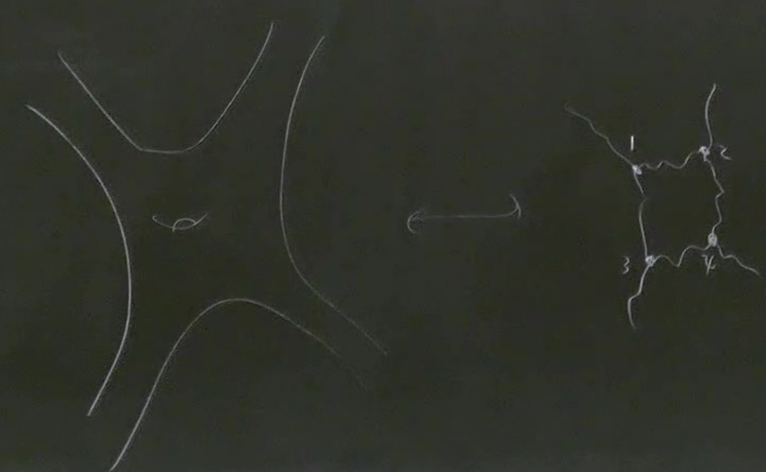
1) U(N) Gauge Sym from Branes | 3)

2) Diagrams for Strings.

$$S = \int \partial X \bar{\partial} X (\eta_{..} + R_{....} X X)$$

$\Rightarrow \langle \; e^{\int}$

$S = \int_{\Sigma} G_{\mu\nu} \partial$



$1 + \lambda_0 \int$