Title: PSI 2017/2018 - String Theory - Lecture 10

Date: Mar 05, 2018 10:15 AM

URL: http://pirsa.org/18030016

Abstract:

$$\frac{1}{\alpha'}\int \sqrt{h}\; h^{ab}\, G_{\mu\nu}[X,\mu]\,\partial_a X^{\mu}\,\partial_b X^{\nu}$$

$$\frac{4}{\alpha'} = M^{3}_{\text{STRING}}$$

$$T^a_{\ a} = \beta^G_{\mu\nu}[G_{\alpha\beta}]\ \partial_a X^\mu \partial^a X^\nu$$

$$\mu \partial_\mu G_{\alpha\beta} = \beta^G_{\alpha\beta}[G]$$

$$\beta^G_{\mu\nu}[G] = 0$$

$$\beta^G_{\mu\nu} \underset{\alpha' \to 0}{=} \alpha' R_{\mu\nu}[G] + \cdots$$

$$\beta_{\mu\nu}[G] = 0$$

$$\beta^{G}_{\mu\nu} = \alpha' R_{\mu\nu}[G] + \ldots$$

$\alpha' \to 0$

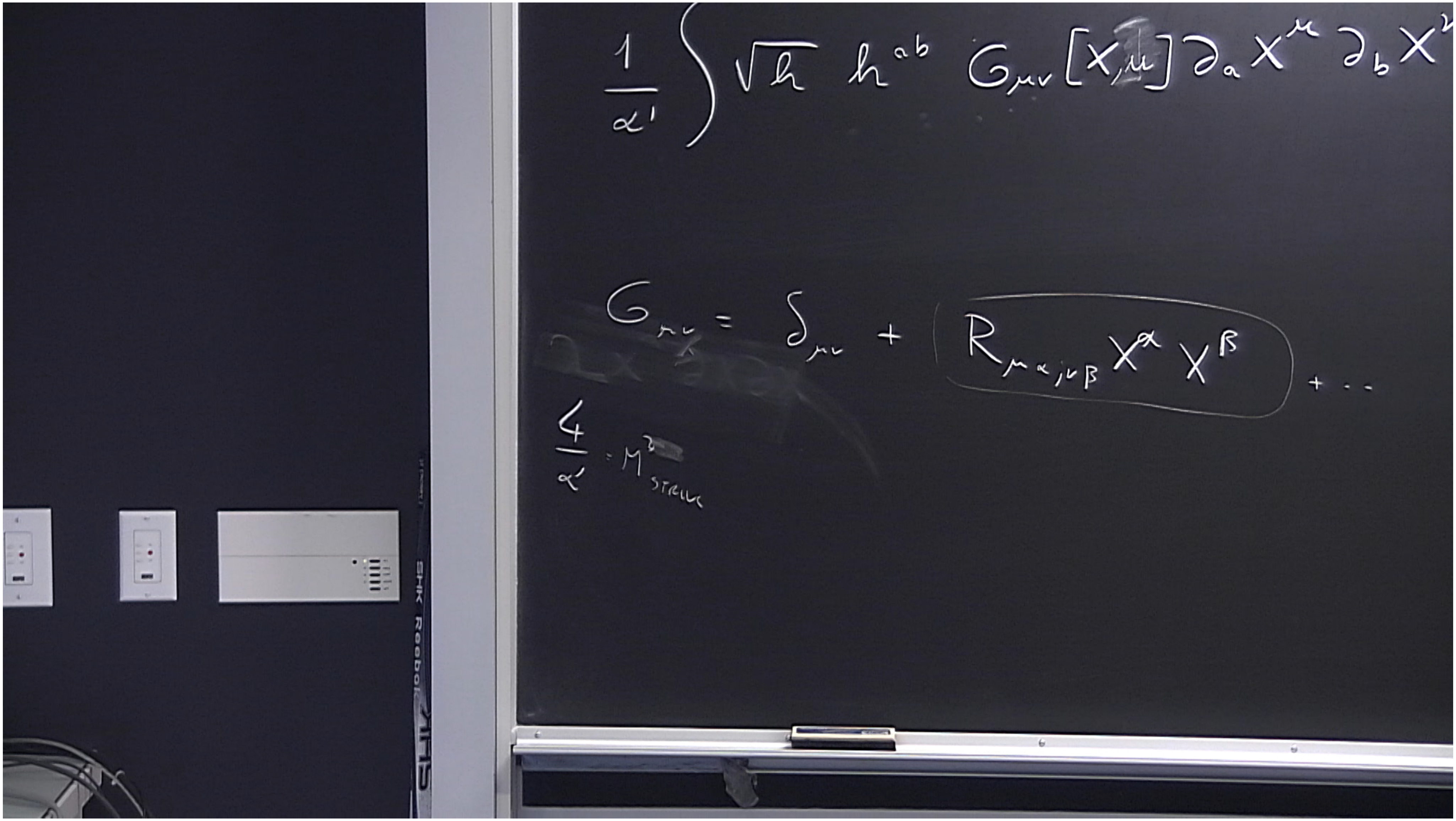
$$T^a_{\ a} = \beta^G_{\mu\nu}[G_{\alpha\beta}]\ \partial_a X^\mu \partial^a X^\nu$$

$$\mu \partial_\mu G_{\alpha\beta} = \beta^G_{\alpha\beta}[G]$$

$$\beta^G_{\mu\nu}[G] = 0$$

$$\beta^G_{\mu\nu} = \alpha' R_{\mu\nu}[G] + \dots$$

$\alpha' \to 0$


$\frac{1}{\alpha'}\int \sqrt{h}\, h^{ab}\, G_{\mu\nu}[X,\mu]\,\partial_a X^\mu \partial_b X^\nu$
$G_{\mu\nu} = \delta_{\mu\nu} + R_{\mu\alpha;\nu\beta} X^\alpha X^\beta + \dots$
$\frac{4}{\alpha'} = M^2_{\text{STRING}}$
SHK Reebok

$$\int DX\, Db\, Dc\; e^{\ldots} \prod_i V_i$$

$$= \sum_n \frac{1}{n!} \int DX\, Db\, Dc \prod_i V_i \left[\int \epsilon_{\mu\nu}(p)\, e^{ipX}\, \partial X^\mu \bar{\partial} X^\nu \, dz\, d\bar{z} \right]^n$$

$$G_{\mu\nu} = \eta_{\mu\nu} + \delta G_{\mu\nu}$$

$$|g\rangle \otimes |m\rangle \Rightarrow c\bar{c} V_m \Rightarrow \int V_m \, dz\, d\bar{z}$$

$L_0 |m\rangle = 1 |m\rangle$

$\bar{L}_0 |m\rangle = |m\rangle$

V_m SPIN 0 $(L_0 - \bar{L}_0)$

DIM 2 $(L_0 + \bar{L}_0)$

$$T^a_{\ a} = \beta^G_{\mu\nu}[G_{\alpha\beta}]\ \partial_a X^\mu \partial^a X^\nu$$

$$\mu \partial_\mu G_{\alpha\beta} = \beta^G_{\alpha\beta}[G]$$

$$\beta^G_{\mu\nu}[G] = 0$$

$$\beta^G = \frac{\delta S^{eff}}{\delta G^{\mu\nu}}$$

$$\beta^G_{\mu\nu} = \alpha' R_{\mu\nu}[G] + \dots$$

$\alpha' \to 0$

$$\beta^B = \frac{\delta S^{eff}}{\delta B}$$

$$\beta^\phi = \dots$$

$$\beta^T = \dots$$

$$\beta^T = 0$$

$$\beta^B = 0$$

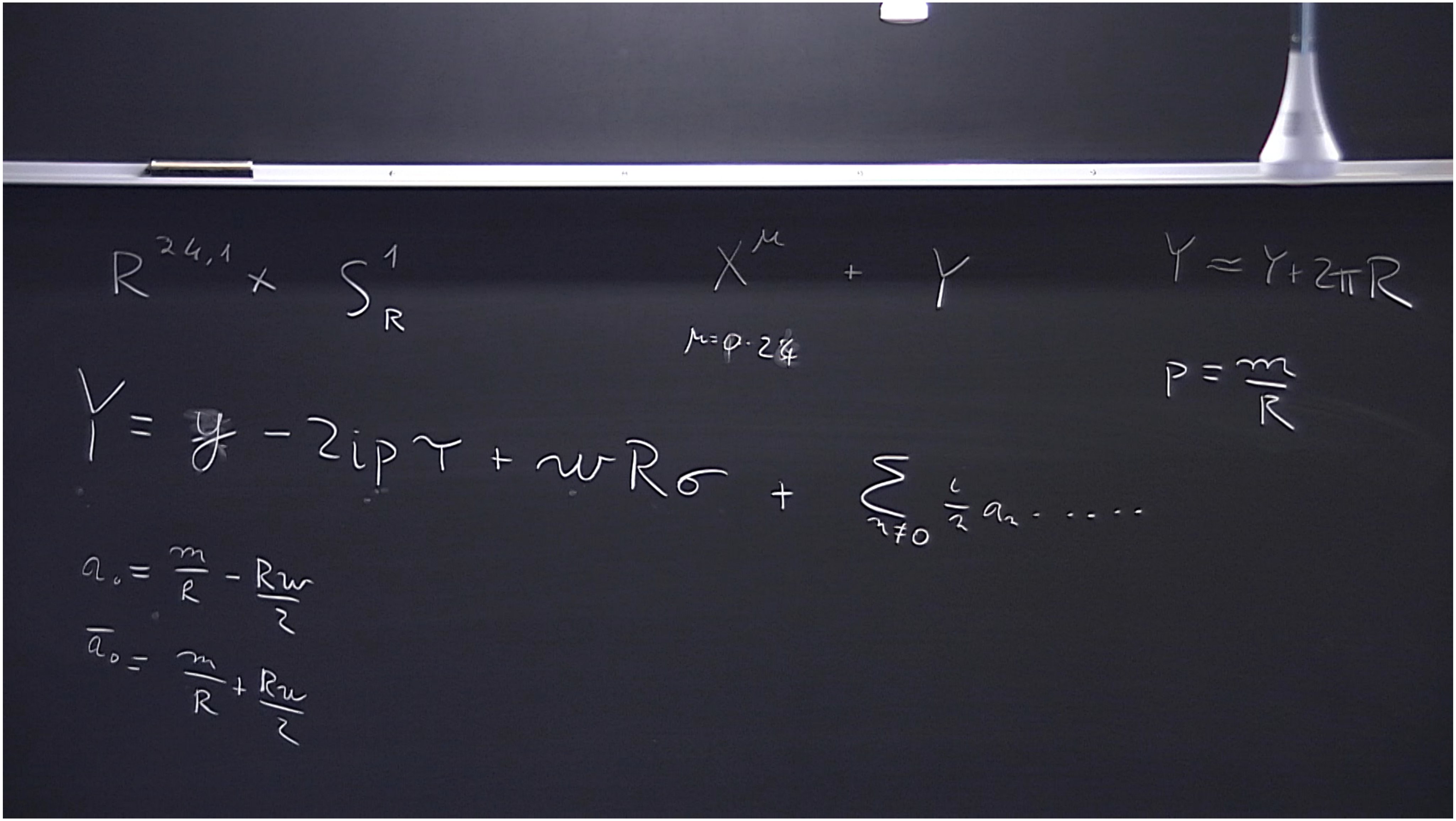
$$\beta^\phi = 0$$

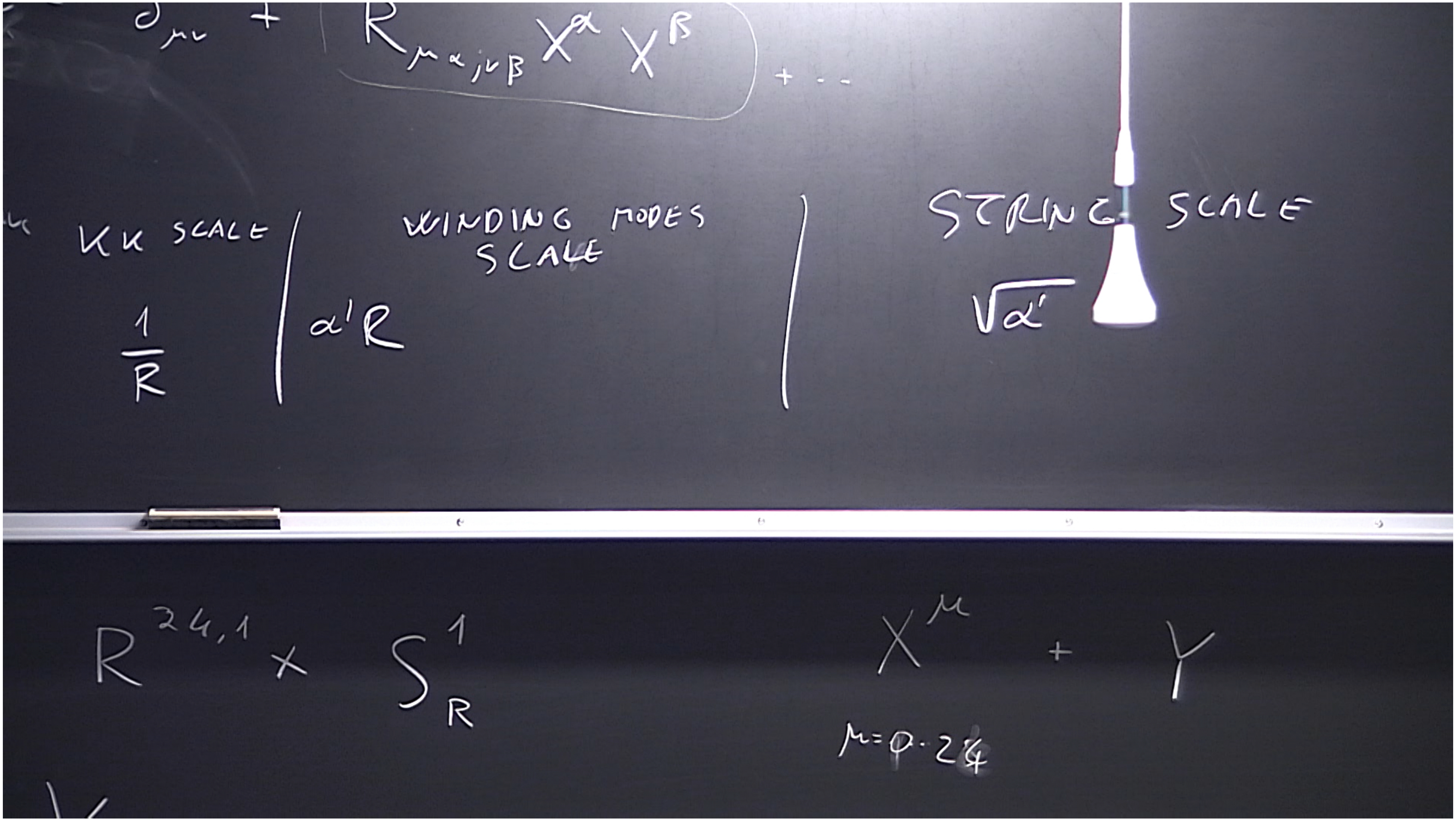
$= 0$

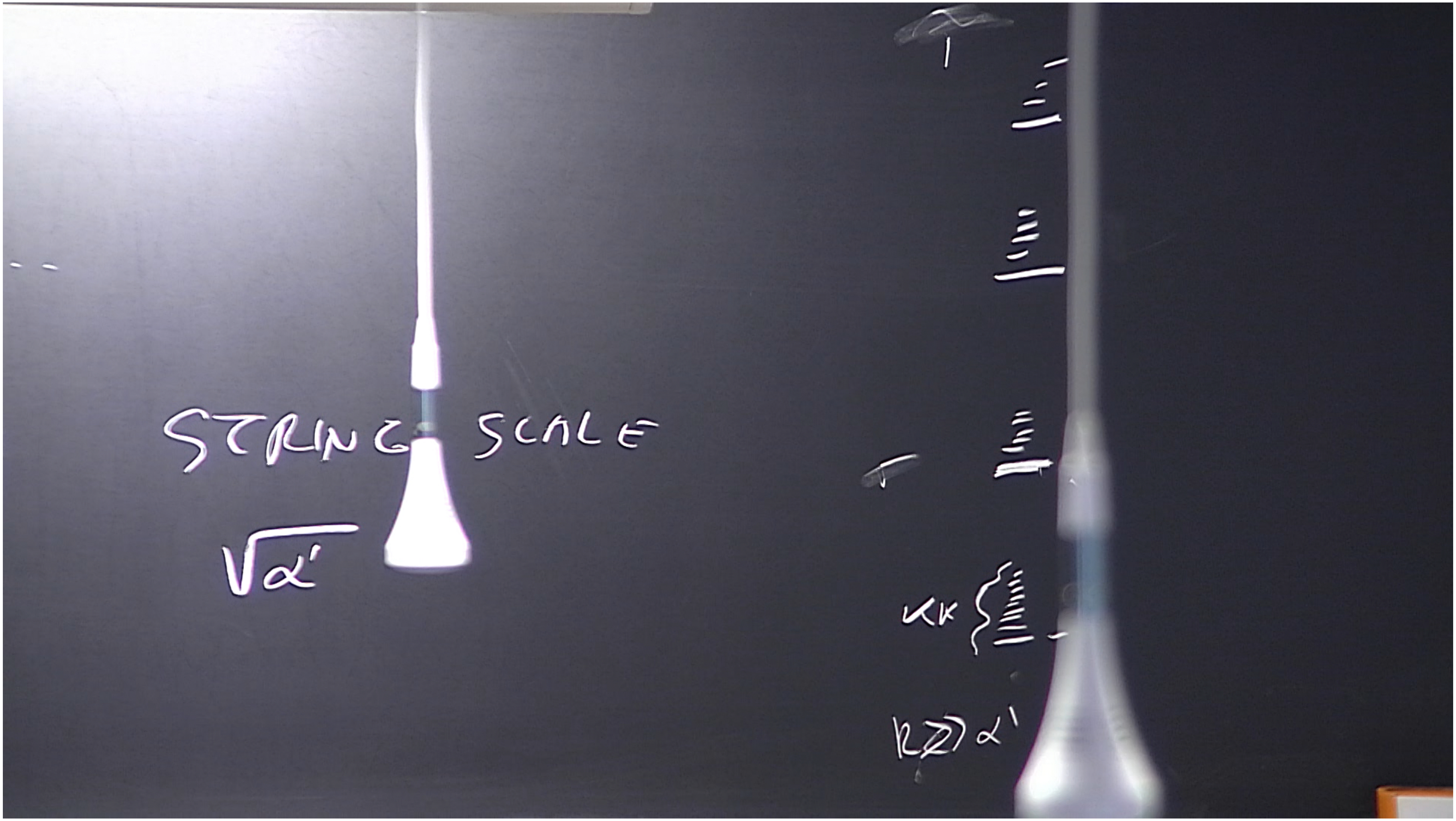
$\beta^{\phi} = 0$

$$S^{eff} = \frac{1}{g^2}\int d^{26}x \sqrt{-\det G}\; e^{-2\Phi}\left[R - \frac{1}{12}(dB)^2 + 4(\partial\phi)^2\right]$$

$$G_{\mu\nu} \to e^{\alpha\phi}\, G^{EIN}_{\mu\nu}$$


$R^{24,1} \times S^1_R$
$X^\mu + Y$
$\mu = 0 \cdots 24$
$Y \simeq Y + 2\pi R$
$p = \frac{m}{R}$
$Y = y - 2ip\tau + wR\sigma + \sum_{n\neq 0} \frac{i}{n} a_n \cdots\cdots$
$a_0 = \frac{m}{R} - \frac{Rw}{2}$
$\bar{a}_0 = \frac{m}{R} + \frac{Rw}{2}$


+ R_{μα;νβ} X^α X^β + ...
KK SCALE
1/R
WINDING MODES SCALE
α'R
STRING SCALE
√α'
R^{24,1} × S^1_R
X^μ + Y
μ=0..24


STRING SCALE
√α'
KK
R ≫ α'