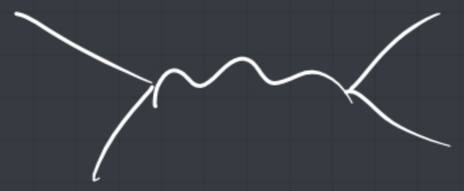


$$A \frac{1}{2M_P^2}\left(\frac{stu}{t} + \frac{st}{u} + \frac{tu}{s}\right)$$

$$A''(s) = \frac{1}{t(M_P^2)}$$

2408.06440 – S. Caron-Huot, ..

2410.21499 – k. Haring, Z. Li, Bordelon

Gravity requires ∞ UV states (dispersion relations!)

$$\langle \prod V_{w_i}(x_i, z_i) \rangle = N^{1-g-\frac{w}{2}}$$

$$L = \frac{1}{2}\sum_i (w_i - 1) + (1-g)$$

$$\langle V_w(x_1,z_1)\, V_w(x_2,z_2) \rangle \sim$$

Flat space

NS-R $\quad \alpha^M, \psi^M \quad SO(8)$

$\psi^M \to V$: fermions on WS, boson w.r.t. ST

$h = \frac{1}{2}$

SPACETIME FER R-sector

GS $\quad \alpha^M \quad S^{\dot{\alpha}} \leftarrow 8_s$

S: worldsheet bosons

$sl(2,\mathbb{R})^{(1)} \oplus su(2)^{(1)}$

J^a, ψ^a

$h = \frac{1}{2}$

$psu(1,1|2)$

$su(1,1) \oplus su(2)$ $\quad 2 \ (2,2)$

$su(1,1) = sl(2,\mathbb{R})$

$h = 1$

L

$G^{\pm} \qquad G'^{\pm}$

$\mathcal{N}=1$ $\quad [L_m, L_n] =$ Virasoro

$$[L_m, G_r] = \left(\frac{m}{2} - r\right) G_{m+r}$$

$$\{G_r, G_s\} = 2L_{r+s} + \frac{c}{3}\left(r^2 - \frac{1}{4}\right)\delta_{r+s}$$

dual CFT $\mathcal{N}=4$ SCFT

$L_n \ , \ J^a_n$ ← $su(2)$ R-symmetries

$h = 1, 0$ (Mobius)

$G^{\pm}_r \qquad G'^{\pm}_r$

$\pm\frac{1}{2}$

$$L^{ST}_n = \oint \ \# \gamma^n J^3 \ \# \gamma^{n+1} J^- \ \# \gamma^{n-1} J^+$$

$$sl(2,\mathbb{R})^{(1)}_k \oplus su(2)^{(1)}_k \oplus T^4$$

$(1,1) \quad (1,1)$ → $(2,2)$

T^4 ← $(4,4)$

$G \to \Sigma$

$T_q \to \Sigma$

$\int_\Sigma \frac{dA_I}{2\pi} \in \mathbb{Z}$

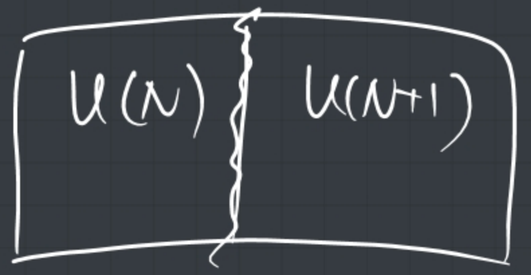
$G = U(N) \quad \alpha = e_I - e_J$

$A_\alpha = A_{IJ} \qquad \int \frac{dA_{IJ}}{2\pi} = n_I - n_J$

$A_{IJ} = \bar{A}_{IJ} + a_{IJ}$

$c_1(\mathcal{L}_\alpha) = n_I - n_J$

'93 Blau et al



$U(N) \quad N_f \; D, \bar{D} + 1$ adj.

$\to$ XXX Length N_f. N q

$e^{-\frac{\varepsilon}{2} C_2(R)}$

$\varepsilon \gg 1$ Strong

$e^{-\frac{(2\pi m)^2}{2\varepsilon}}$

$\varepsilon \ll 1$ Weak