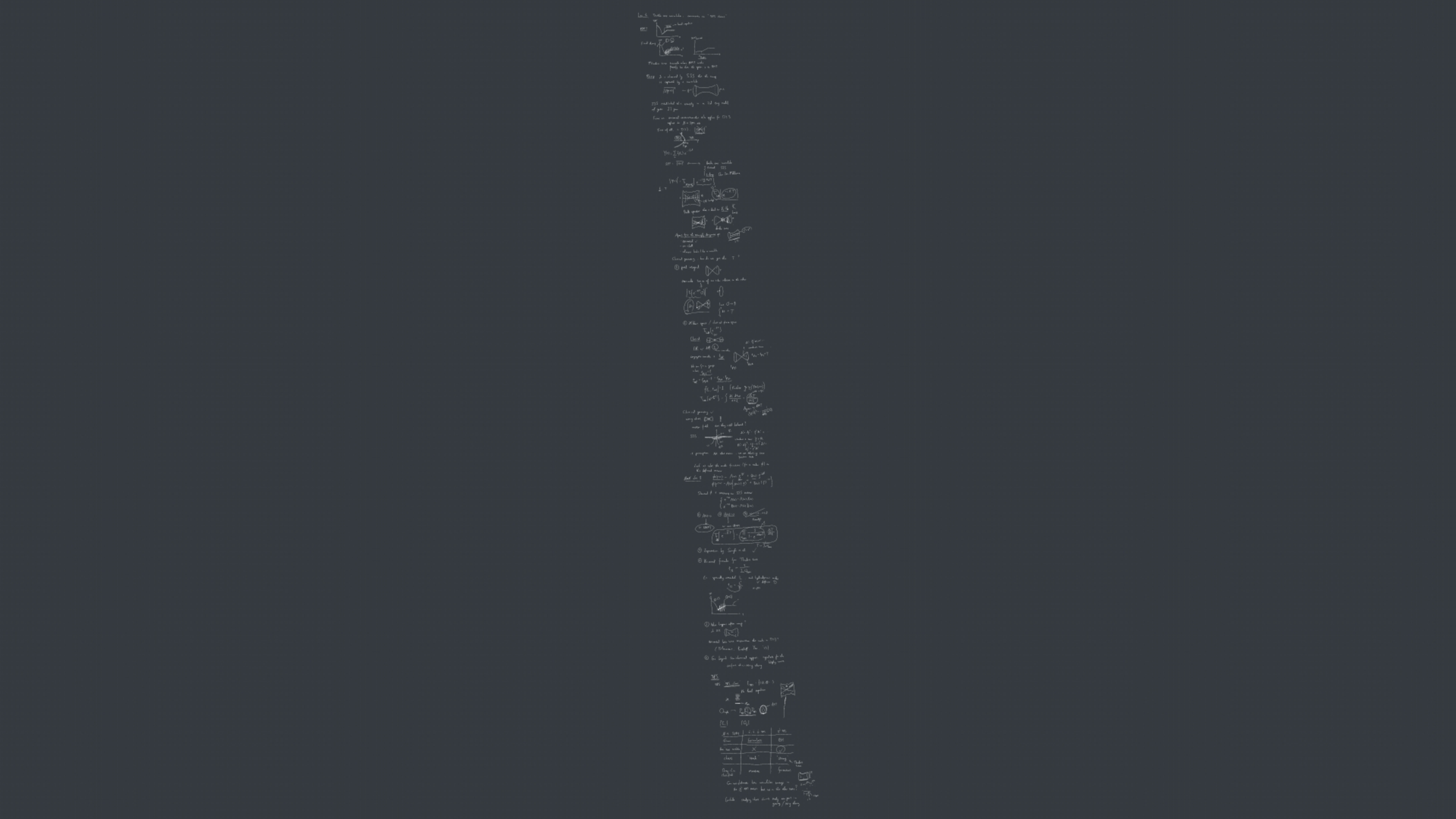


$AdS_3 \times X \longleftrightarrow Sym_N(\mathbb{R} \times X)$

q-deformation

Wakimoto realization

β, γ, ϕ $\quad \lambda(\beta)=1$, $\lambda(\gamma)=0$

$J^+ = \beta$

$J^3 = \partial\phi + \beta\gamma$

$J^- = \beta\gamma^2 + \gamma\partial\gamma + \partial\gamma$

$sl(2,\mathbb{R})_1$ WZW model

$L_0^{SL} = J_0^3$

$L_{\pm 1}^{SL} = J_0^{\pm}$

$L_n^{SL} = \int \gamma^{n+1} J$

$L_n^{WZW} = \frac{1}{(k-2)} \sum J_m^a J_{n-m}^a$

bosonic string $\quad X^i(\sigma,\tau) = x_0^i + q_0^i \tau + \sum_n \frac{\alpha_n^i}{n} e^{in(\sigma+\tau)} + \frac{\tilde{\alpha}_n^i}{n} e^{in(\sigma-\tau)}$

$\alpha_{-n}^i \quad \tilde{\alpha}_{-n}^i$

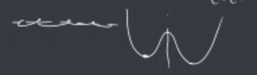
$L_n \phi = 0 \quad n>0$

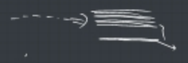
$L_0 \phi = \phi$

$\phi = \alpha_{-n_1}^{i_1} \cdots \alpha_{-n_p}^{i_p} |p\rangle$

$\sum_{i=1}^{p} n_i + p^2 = 1$

$c=26$





Ising CFT

$H = \sum Z_i Z_{i+1} - h \sum X_i$

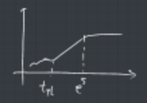
Ising

$-\lambda \sum Z Z X_*$

KPP

$t_{FL} \sim \frac{1}{\mathrm{Im}(\omega_{dom})}$

$O(1)$



$t_{FL} \quad e^{\beta}$

D=3 $\quad$ RMT + Virasoro sym

$|Z(p,\tau)|^2$ modular invariance

Cauchy Jensen

D=3