Ginsparg

$$\text{background} \begin{cases} \not{k} \\ \not{2} \\ \not{1}^{\alpha} \end{cases}$$

$$\text{Het world-sheet} \begin{cases} \not{\partial}^{\mu} & 1 \leqslant \mu \leqslant 8 \\ \not{\partial}^{\mu} & 1 \leqslant \mu \leqslant 8 \\ \not{Q}^{\alpha} & \alpha \in 16 \end{cases}$$

$$\boxed{\not{\partial}^{\mu} \not{\partial}^{\mu} \not{Q}^{\alpha}}_{\not{k} \not{2} \not{1}} = \not{\partial}^{\mu}_{-} {}_{\mu} \not{k}_{\nu} \not{k} {}_{*} \not{\partial}^{\nu}_{-} + \not{\partial}^{\mu}_{-} {}_{*} \not{\partial}^{\nu}_{-} {}_{\mu\nu} \not{2} + \not{\partial}^{\mu} {}_{\mu} \not{k}_{\nu} \not{k} \not{\partial}^{\nu}_{-} + \overset{*}{\not{Q}}{}^{\alpha} {}_{*} \not{Q}^{\alpha}_{-} + \overset{*}{\not{Q}}{}^{\alpha} \not{\partial}^{\mu}_{-} {}_{\mu} \not{1}^{\alpha} \not{Q}^{\alpha}$$

$$= \underbrace{\tau_{2} {}_{1} \not{\partial}^{\mu}_{-} {}_{1} \not{\partial}^{\nu}_{-} + \frac{1}{\tau_{2}} \overbrace{{}_{2} \not{\partial}^{\mu}_{-} - \tau_{1} {}_{1} \not{\partial}^{\mu}_{-}} \overbrace{{}_{2} \not{\partial}^{\nu}_{-} - \tau_{1} {}_{1} \not{\partial}^{\nu}_{-}}}_{\mu} {}_{\mu} \not{k}_{\nu} \not{k} + {}_{1} \not{\partial}^{\mu}_{-} {}_{2} \not{\partial}^{\nu}_{-} {}_{\mu\nu} \not{2} + \overset{*}{\not{Q}}{}^{\alpha} {}_{*} \not{Q}^{\alpha}_{-} + \overset{*}{\not{Q}}{}^{\alpha} \not{\partial}^{\mu}_{-} {}_{\mu} \not{1}^{\alpha} \not{Q}^{\alpha}$$

$$\text{space-time lattice } \mathbb{R}^{8} \supset \Lambda = \mathbb{Z}^{k} \frac{{}_{1} \not{l}}{\vdots} \ni n^{i} \; {}_{i} \not{l}$$

$${}^{\tau : \sigma + 2\pi} \not{\partial}^{\mu} = {}^{\tau : \sigma} \not{\partial}^{\mu} + 2\pi i \, n^{i} \; {}_{i} \not{l}^{\mu}$$

$$z = \sigma_{1} + \tau \, \sigma_{2}$$

$$\frac{d \overset{*}{z} dz}{2i} = \frac{\left(d\sigma_{1} + \overset{*}{\tau} d\sigma_{2} \right) \wedge \left(d\sigma_{1} + \tau d\sigma_{2} \right)}{2i} = \frac{\overset{*}{\tau} d\sigma_{2} \wedge d\sigma_{1} + \tau d\sigma_{1} \wedge d\sigma_{2}}{2i} = \frac{\tau - \overset{*}{\tau}}{2i} d\sigma_{1} \wedge d\sigma_{2} = \mathcal{I}(\tau) \, d\sigma_{1} \wedge d\sigma_{2}$$