$$(\tau)^{k} = \bigotimes_{n<0} \mathfrak{e}^{\bar{z}^{n}k/2\cdot\overset{*}{\bar\partial}_n}\,\mathfrak{e}^{-\bar{z}^{-n}k/2\cdot\partial_n} \boxtimes \mathfrak{e}^{k\cdot Xi}\,\mathfrak{e}^{x}\!\not{k}\cdot(P+k/2) \boxtimes \bigotimes_{n>0} \mathfrak{e}^{z^{n}k/2\cdot\overset{*}{\partial}_n}\,\mathfrak{e}^{-z^{-n}k/2\cdot\partial_n}$$

$${}^{\tau}V = {}^{\tau L_0 i}\mathfrak{e}\;{}^{0}V\;{}^{-\tau L_0 i}\mathfrak{e}$$

$${}^{\underline{z}}\underline{V} = \underline{z}^{\underline{L}}\,\underline{V}\,\underline{z}^{-\underline{L}}$$

$${}^{\bar{z}}\bar{V} = \bar{z}^{\bar{L}}\,\bar{V}\,\bar{z}^{-\bar{L}}$$

$$\underline{L}_m \ast {}^{\underline{z}}\underline{V} = \underbrace{\underline{z}^{m+1}\underline{\partial} + m\underline{z}^{m}}\;{}^{\underline{z}}\underline{V}$$

$$\bar{L}_m \ast {}^{\bar{z}}\bar{V} = \underbrace{\bar{z}^{m+1}\bar{\partial} + m\bar{z}^{m}}\;{}^{\bar{z}}\bar{V}$$

$${}^{\tau}V = \int_{d\sigma/\pi}^{0|\pi} {}^{\tau-\sigma}\underline{V}\boxtimes{}^{\tau+\sigma}\bar{V} = \int_{d\sigma/\pi}^{0|\pi} {}^{-2i\sigma}\mathfrak{e}^{\underline{L}\boxtimes\bar{\imath}\,-\,\underline{\imath}\boxtimes\bar{L}}\;\underbrace{{}^{\tau}\underline{V}\boxtimes{}^{\tau}\bar{V}}\;{}^{2i\sigma}\mathfrak{e}^{\underline{L}\boxtimes\bar{\imath}\,-\,\underline{\imath}\boxtimes\bar{L}}$$

$$= \int_{d\sigma/\pi}^{0|\pi} \underbrace{{}^{-2\sigma i}\mathfrak{e}^{\underline{L}}\boxtimes{}^{2\sigma i}\mathfrak{e}^{\bar{L}}}\;\overbrace{\underbrace{{}^{\tau i}\mathfrak{e}^{\underline{L}}\underline{V}\,{}^{-\tau i}\mathfrak{e}^{\underline{L}}}\boxtimes\bar{\imath}}\;\overbrace{\underline{\imath}\boxtimes\underbrace{{}^{\tau i}\mathfrak{e}^{\bar{L}}\bar{V}\,{}^{-\tau i}\mathfrak{e}^{\bar{L}}}}\;\underbrace{{}^{2\sigma i}\mathfrak{e}^{\underline{L}}\boxtimes{}^{-2\sigma i}\mathfrak{e}^{\bar{L}}}$$

$$= \int_{d\sigma/\pi}^{0|\pi} \overbrace{\underbrace{{}^{-2\sigma i}\mathfrak{e}^{\underline{L}}\,{}^{\tau i}\mathfrak{e}^{\underline{L}}}\boxtimes\underbrace{{}^{2\sigma i}\mathfrak{e}^{\bar{L}}\,{}^{-\tau i}\mathfrak{e}^{\bar{L}}}}\;\underbrace{\underline{V}\boxtimes\bar{V}}\;\overbrace{\underbrace{{}^{-\tau i}\mathfrak{e}^{\underline{L}}\,{}^{2\sigma i}\mathfrak{e}^{\underline{L}}}\boxtimes\underbrace{{}^{\tau i}\mathfrak{e}^{\bar{L}}\,{}^{2\sigma i}\mathfrak{e}^{\bar{L}}}}$$

$$= \int_{d\sigma/\pi}^{0|\pi} \underbrace{{}^{(\tau-2\sigma)\,i}\mathfrak{e}^{\underline{L}}\boxtimes{}^{(2\sigma-\tau)\,i}\mathfrak{e}^{\bar{L}}}\;\underbrace{\underline{V}\boxtimes\bar{V}}\;\underbrace{{}^{(2\sigma-\tau)\,i}\mathfrak{e}^{\underline{L}}\boxtimes{}^{(\tau+2\sigma)\,i}\mathfrak{e}^{\bar{L}}}$$

$${}^{\tau}k = \overleftarrow{{}^{\tau X|ki}\mathfrak{e}} = \underbrace{1\boxtimes\exp\overbrace{\sum_{n\geqslant 1} k^{\mu}\underset{\mu\nu}{\eta}X^{\nu}_{-n}\,{}^{\tau i}\mathfrak{e}^{n}}\boxtimes\bar{\imath}}\;\underbrace{\exp\overbrace{k^{\mu}\underset{\mu\nu}{\eta}\underbrace{X^{\nu}+\tau X^{\nu}_{0}}}\boxtimes\imath\boxtimes\bar{\imath}}\;\underbrace{1\boxtimes\imath\boxtimes\exp\overbrace{-\sum_{n\geqslant 1} k^{\mu}\underset{\mu\nu}{\eta}X^{\nu}_{n}\,{}^{-\tau i}\mathfrak{e}^{n}}}$$

$$= \exp\overbrace{k^{\mu}\underset{\mu\nu}{\eta}\underbrace{X^{\nu}+\tau X^{\nu}_{0}}}\boxtimes\exp\overbrace{\frac{1}{2}\sum_{n\geqslant 1} k^{\mu}\underset{\mu\nu}{\eta}Z^{\nu}_{-n}\,{}^{\tau i}\mathfrak{e}^{n}}\boxtimes\exp\overbrace{-\frac{1}{2}\sum_{n\geqslant 1} k^{\mu}\underset{\mu\nu}{\eta}\bar{Z}^{\nu}_{n}\,{}^{-\tau i}\mathfrak{e}^{n}}$$

$$\text{dilaton}\quad {}^{z}k = \overleftarrow{\underline{\partial}X^{\mu}\underset{\mu\nu}{\eta}\bar{\partial}X^{\nu\,z}{}^{X|ki}\mathfrak{e}}:\quad k^{\mu}\underset{\mu\nu}{\eta}k^{\nu} = 0$$

$$\text{graviton}\quad {}^{z}\overline{G{:}k} = \overleftarrow{\underline{\partial}X^{\mu}\underset{\mu\alpha}{\eta}G^{\alpha\beta}\underset{\beta\nu}{\eta}\bar{\partial}X^{n\,z}{}^{X|ki}\mathfrak{e}}:\quad k^{\mu}\underset{\mu\nu}{\eta}k^{\nu} = 0{:}\quad G^{\mu\lambda}\underset{\mu\nu}{\eta}k^{\nu} = 0$$

$$\text{matrixon}\quad {}^{z}\overline{A{:}k} = \overleftarrow{\underline{\partial}X^{\mu}\underset{\mu\alpha}{\eta}A^{\alpha\beta}\underset{\beta\nu}{\eta}\bar{\partial}X^{\nu\,z}{}^{X|ki}\mathfrak{e}}:\quad k^{\mu}\underset{\mu\nu}{\eta}k^{\nu} = 0{:}\quad A^{\mu\lambda}\underset{\mu\nu}{\eta}k^{\nu} = 0$$

unbroken symm $n = -1{:}0{:}1$

$$
{}^{tL_n}\mathfrak{e}\ {}^{y}V\ y^{n}\ {}^{-tL_n}\mathfrak{e} = {}^{y\cdot g}V\ {}^{y}\underline{g}^{n}
$$

$$
\frac{{}^{y}V}{y} = \overbrace{a - cg \cdot y}^{2} \frac{{}^{g\cdot y}V}{g \cdot y}
$$