Townsend/Imamura

Dp brane $\begin{cases} \mathbb{0} \\ \mathbb{1} \quad \text{world-volume vector field open strings} \end{cases}$

open string endpoint charge=1

$$\overset{u}{\overbrace{\mathbb{0} \bowtie \mathbb{0}}} = \overset{u\mathbb{0}}{\mathbb{0}}$$

$$\overset{u}{\underset{ij}{\overbrace{\mathbb{0} \bowtie \mathbb{1}\mathbb{0}}}} = \overset{u}{\underset{i-}{\mathbb{0}}}{}^{\mu}\;\overset{u}{\underset{j-}{\mathbb{0}}}{}^{\nu}\;\overset{u\mathbb{0}}{\underset{\mu\nu}{\mathbb{1}\mathbb{0}}}$$

$$\overset{u}{\underset{ij}{\overbrace{\mathbb{0} \bowtie \mathbb{2}}}} = \overset{u}{\underset{i-}{\mathbb{0}}}{}^{\mu}\;\overset{u}{\underset{j-}{\mathbb{0}}}{}^{\mu}\;\overset{u\mathbb{0}}{\underset{\mu\nu}{\mathbb{2}}}$$

$$\overset{u}{\boxed{\mathbb{0}|\mathbb{1}}}\Big|_{\text{BI}}^{\mathbb{1}\mathbb{0}|\mathbb{2}|\mathbb{0}} = \frac{1}{\overset{u}{\overbrace{\mathbb{0} \bowtie \mathbb{0}}}}\det{}^{1/2}\left(\overset{u}{\underset{ij}{\overbrace{\mathbb{0} \bowtie \mathbb{1}\mathbb{0}}}} - \overset{u}{\underset{ij}{\overbrace{\mathbb{0} \bowtie \mathbb{2}}}} + \frac{\overset{u}{\underset{ij-}{\mathbb{1}}}}{\ell^2}\right)$$

$$m=0: \quad \overset{u}{\boxed{\mathbb{0}|\mathbb{1}}}\Big|_{\text{WZ}}^{\mathbb{1}\mathbb{0}|\mathbb{2}|\mathbb{0}} = \overset{u}{\overbrace{\underbrace{\mathbb{0} \bowtie \not\subset} \wedge \exp\left(\frac{\mathbb{1}}{\ell^2} - \mathbb{0} \bowtie \mathbb{2}\right)}}$$

$$\not\subset = \not{0} + \not{2} + \not{4} + \not{6} + \not{8}$$

$$\not\subset = \not{1} + \not{3} + \not{5} + \not{7} + \not{9}$$

$$\overset{u}{\boxed{\mathbb{0}|\mathbb{1}}}\Big|_{\text{Dp}}^{\mathbb{1}\mathbb{0}|\mathbb{2}|\mathbb{0}} = \frac{1}{\ell^{p+1}}\;\overset{u}{\boxed{\mathbb{0}|\mathbb{1}}}\Big|_{\text{BI}}^{\mathbb{1}\mathbb{0}|\mathbb{2}|\mathbb{0}} + \ell^{3-p}\;\overset{u}{\boxed{\mathbb{0}|\mathbb{1}}}\Big|_{\text{WZ}}^{\mathbb{1}\mathbb{0}|\mathbb{2}|\mathbb{0}}$$