Johansen

$$\text{F}: \quad 7 \ddagger 2^0_{\mathbb{C}}$$

ell K3

$$1_{\mathbb{C}} = \mathbb{P}^1$$

$$2_{\mathbb{C}} = 1_{\mathbb{C}} \times 1^0_{\mathbb{C}}$$

$$\text{F } 7 \ddagger 1_{\mathbb{C}} \, 1^0_{\mathbb{C}}$$

$$[\mathbb{P}^1] = \mathbb{C}^{-2}$$

$$[\mathbb{P}^1]^{-4} = \mathbb{C}^8$$

$$[\mathbb{P}^1]^{-6} = \mathbb{C}^{12}$$

$$\begin{cases} \deg {}^z f = 8 \\ \deg {}^z g = 12 \end{cases}$$

$$2^0_{\mathbb{C}} = \frac{(x{:}y{:}z) \in [1_{\mathbb{C}}]^{-2} \times [1_{\mathbb{C}}]^{-3} \times 1_{\mathbb{C}}}{y^2 = x^3 + 3^z f x + 2^z g = \left(x - {}^z e_1\right)\left(x - {}^z e_2\right)\left(x - {}^z e_3\right)}$$

$$f_z^3 + g_z^2 = \overbrace{{}^z e_1 - {}^z e_2}^{2} \; \overbrace{{}^z e_2 - {}^z e_3}^{2} \; \overbrace{{}^z e_3 - {}^z e_2}^{2}$$

$${}^z \Lambda = 0 \Leftrightarrow z \in 0_{\mathbb{C}} = 24 \subset 1_{\mathbb{C}} = \mathbb{P}^1$$

$$\mathrm{SL}_2\left(\mathbb{Z}\right) \text{ transformed D7}: \quad 7 \ddagger 0_{\mathbb{C}}$$

D7 positions $=$ Wilson line parameters H $/\,\mathbb{T}^2$

brane configuration=multiple D7 same point in $0_{\mathbb{C}}$: $\quad 7 \ddagger 0^a_{\mathbb{C}}$

$$0^{ab}_{\mathbb{C}} = 0^a_{\mathbb{C}} \cap 0^b_{\mathbb{C}} \Longrightarrow U^{\mathbb{C}}_n \text{ gauge}$$