D_7 brane cluster

$$\sharp D_7 = 24$$

$$\begin{bmatrix}1\\0\end{bmatrix}_7^m \begin{bmatrix}1\\-1\end{bmatrix}_7 \begin{bmatrix}1\\-1\end{bmatrix}_7^n : \quad \mathrm{SU}_m \times U_1 \times \mathrm{SU}_n \text{ conventional gauge } \sqsubset \text{ enhanced gauge}$$

$$D_7^{24} = 4 * D_7^6$$

$$D_7^6 = \begin{bmatrix}1\\0\end{bmatrix}_7^4 \begin{bmatrix}1\\-1\end{bmatrix}_7 \begin{bmatrix}1\\-1\end{bmatrix}_7 : \quad \mathrm{SU}_4 \times U_1 \times 1 \text{ conventional gauge } \sqsubset \text{ enhanced gauge } \mathrm{SO}_8 = D_4$$

$$M_{10}^4 \, M_{3:\,-1} \, M_{1\,(-1)} = \left.\begin{array}{c|c} -1 & 0 \\ \hline 0 & -1 \end{array}\right.$$

$$D_7^{24} = 3 * D_7^8$$

$$D_7^8 = \begin{bmatrix}1\\0\end{bmatrix}_7^5 \begin{bmatrix}1\\-1\end{bmatrix}_7 \begin{bmatrix}1\\-1\end{bmatrix}_7^2 : \quad \mathrm{SU}_5 \times U_1 \times \mathrm{SU}_2 \text{ conventional gauge } \sqsubset \text{ enhanced gauge } E_6$$

$$D_7^{24} = D_7^6 + 2 * D_7^9$$

$$D_7^9 = \begin{bmatrix}1\\0\end{bmatrix}_7^6 \begin{bmatrix}1\\-1\end{bmatrix}_7 \begin{bmatrix}1\\-1\end{bmatrix}_7^2 : \quad \mathrm{SU}_5 \times U_1 \times \mathrm{SU}_2 \text{ conventional gauge } \sqsubset \text{ enhanced gauge } E_7$$

$$D_7^{24} = D_7^6 + D_7^9 + D_7^{10}$$

$$D_7^{10} = \begin{bmatrix}1\\0\end{bmatrix}_7^7 \begin{bmatrix}1\\-1\end{bmatrix}_7 \begin{bmatrix}1\\-1\end{bmatrix}_7^2 : \quad \mathrm{SU}_5 \times U_1 \times \mathrm{SU}_2 \text{ conventional gauge } \sqsubset \text{ enhanced gauge } E_8$$