

Magnetic Quivers and SCFTs

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[1908.04245] [2006.16994] [2010.05889]

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Magnetic Quiver

We look at $4d \mathcal{N} = 2$ and $5d \mathcal{N} = 1$ SCFTs.

Very rich vacuum structures \rightarrow Study the **Higgs branch**

Difficult to study directly

Magnetic Quiver

Coulomb branch($3d \mathcal{N} = 4$ Magnetic Quiver)

= Higgs branch($4d \mathcal{N} = 2$, $5d \mathcal{N} = 1$ SCFT)

Obtain magnetic quivers through **brane systems**

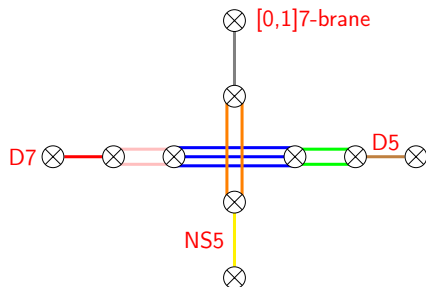
$5d \mathcal{N} = 1$ SCFT

$SU(3)$ with $N_f = 6$ (CS level = 0) at **infinite gauge coupling** $g \rightarrow \infty$.

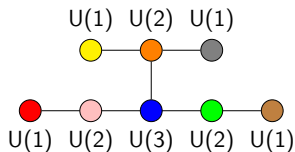
Here, we are at the superconformal fixed point

Brane system for Higgs branch involves 5-branes and 7-branes

Brane system



Magnetic Quiver



[Ferlito, Hanany, Mekareeya, Zafrir '17]

[Cabrera, Hanany, Yagi '18]

5d $\mathcal{N} = 1$ SCFT

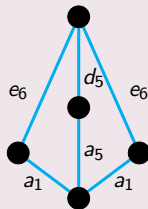
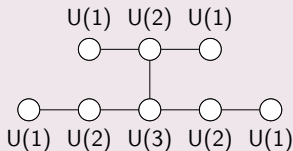
$$\text{Higgs}^{5d \mathcal{N}=1}(SU(3) \text{ with } N_f = 6)_{g \rightarrow \infty} = \text{Coulomb}^{3d \mathcal{N}=4} \left(\begin{array}{ccccc} & & \text{U}(1) & \text{U}(2) & \text{U}(1) & & \\ & & \circ & \text{---} & \circ & & \\ & & & & | & & \\ \circ & \text{---} & \circ & \text{---} & \circ & \text{---} & \circ & \text{---} & \circ \\ \text{U}(1) & & \text{U}(2) & & \text{U}(3) & & \text{U}(2) & & \text{U}(1) \end{array} \right)$$

4d $\mathcal{N} = 2$ SCFT

$$\begin{array}{ccc}
 \text{Higgs}^{5d \mathcal{N}=1}(SU(3) \text{ with } N_f = 6)_{g \rightarrow \infty} = \text{Coulomb}^{3d \mathcal{N}=4} & & \left(\begin{array}{c} \text{U}(1) \quad \text{U}(2) \quad \text{U}(1) \\ \circ - \circ - \circ \\ | \\ \circ - \circ - \circ - \circ - \circ \\ \text{U}(1) \quad \text{U}(2) \quad \text{U}(3) \quad \text{U}(2) \quad \text{U}(1) \end{array} \right) \\
 \downarrow \begin{array}{c} \text{Compactifying on } S^1 \\ \text{with } \mathbb{Z}_2 \text{ twist} \\ \text{[Zafrir '16]} \end{array} & & \downarrow \begin{array}{c} \text{Folding} \\ \text{the legs} \end{array} \\
 \text{Higgs}^{4d \mathcal{N}=2}(C_3A_1 \text{ rank one SCFT}) = \text{Coulomb}^{3d \mathcal{N}=4} & & \left(\begin{array}{c} \circ - \circ \leftarrow \circ - \circ \rightarrow \circ \\ \text{U}(1) \quad \text{U}(2) \quad \text{U}(3) \quad \text{U}(2) \quad \text{U}(1) \end{array} \right)
 \end{array}$$

Explore the different phases of the Higgs branch using **Quiver subtraction**

5d $\mathcal{N} = 1$ Higgs branch phase diagram



4d $\mathcal{N} = 2$ Higgs branch phase diagram

