Ami's talk

Higgs branch in 6d & 5d

Higgs branches are not well studied.

Higgs branch is ~~classical~~
at infinite coupling jumps Higgs branch is different. Gauge theory. H_∞

$\underline{5d}$ $\frac{1}{g^2} \longrightarrow 0$; $\left[\frac{1}{g^2}\right] = 1$ - scale of mass.

↳ new massless states
gauge instantons
symmetry enhancement
new flat directions

$\underline{6d}$ $\frac{1}{g^2} \longrightarrow 0$; $\left[\frac{1}{g^2}\right] = 2$ - scale of Tension of string $\frac{m}{l}$

↳ tensionless strings dim H_∞ can grow by 29 (small instanton transition)

These types of questions could have been asked many years ago but
→ Misconceptions of H does not change
→ Not enough tools.

Typically H_J HK quotient F & D

$H_\infty \to$ SCFT no Lagrangian $\longrightarrow$ no
$\llcorner$ is not HK quotient.

H_∞ is HK cone - Coulomb branch of
3d gauge theory
8 susy's.

2 important features of 3d CB.

$SU(2)_R$ (HK 3 cmplx str.)
$\times$
F (flavor sym)

These are the isometries of the space
any observable is going to rotate
in reps of them.

· How much is needed to construct such
spaces?
Not much $\to$ HK is restrictive enough
that if I know ~~enough~~ F and few more
things.

<u>6d theory</u> SQCD.
arises on the w.v. of 1 M5
on $\mathbb{C}^2/D_{4k}$ singularity.

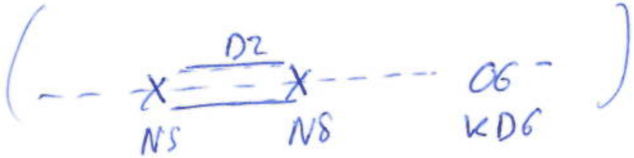
$\square$ SO(4k)
|
O
Sp(k-4)
$1/g^2$

$$H_J = \{ M_{4k\times 4k} : M + M^T, M^2 = 0, r(M) \le 2k-8 \}$$

$2^{k-4}\, 1^{4k-2(k-4)}$

$\frac{1}{g^2} \to 0$: SO(4k) remains global symmetry.
(exception $k = 4 \cdot E_8$)

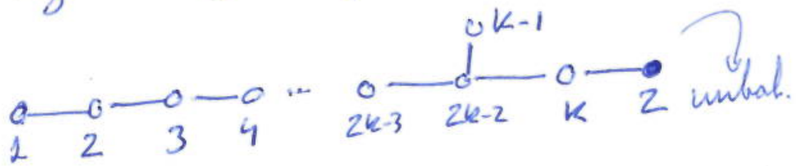
New states on the tensionless string



dim grows by 29

3d Coulomb branch : for a quiver the
subset of balanced nodes forms the
Dynkin diagram of the global symmetry
$\#$neigh = 2 rank

D_{2k}



$$C^{3d}\Big(\underset{1}{\circ}-\underset{2}{\circ}\cdots\underset{2k-3}{\circ}-\underset{2k-2}{\overset{\overset{k-1}{\circ}}{\overset{|}{\circ}}}-\underset{k}{\circ}-\underset{2}{\bullet}\Big) = H_\infty\Big(\overset{SO(4k)}{\square}\!-\!\underset{Sp(k-4)}{\circ}\Big)$$

can be constructed just like the H_f FXD ; using monopole operators.

$\hookrightarrow$ imbalance $k-4 \rightarrow$ leads to state in the ring spinor of $SO(4k)$

$\frac{k-2}{2}$ of $SU(2)_R$.

<u>Quiver Subtraction</u>

$$C^{3d}\Big(\underset{1}{\circ}-\underset{2}{\circ}-\underset{3}{\circ}\cdots\underset{6}{\overset{\overset{3}{\circ}}{\overset{|}{\circ}}}-\underset{4}{\circ}-\underset{2}{\circ}\Big) = \overline{\min E_8}$$

$$C^{3d}\Big(\underset{1}{\circ}\cdots\underset{2k-4}{\circ}-\underbrace{\underset{2k-8}{\overset{\overset{1}{\circ}}{\overset{|}{\circ}}}\cdots\underset{2k-8}{\circ}-\underset{2k-8}{\overset{\overset{k-4}{\circ}}{\overset{|}{\circ}}}}_{7}-\underset{k-4}{\bullet}\Big) = H_f\Big(\overset{SO(4k)}{\square}\!-\!\underset{Sp(k-4)}{\circ}\Big)$$

Geometric int.

$H_f(\ ) \subset H_\infty(\ )$ transverse slice