S-fold solutions & 3d dual CFTs

w/ A. Tomasiello (1804.06419)

AdS$_4$ sol. in IIB $\longleftrightarrow$ 3d SCFT

10d / 16 susy $\qquad$ $\mathcal{N}=4$

non-geometric $\qquad$ non-Lagrangian (mild)

$SL(2,\mathbb{Z})$ monodromy around S^1

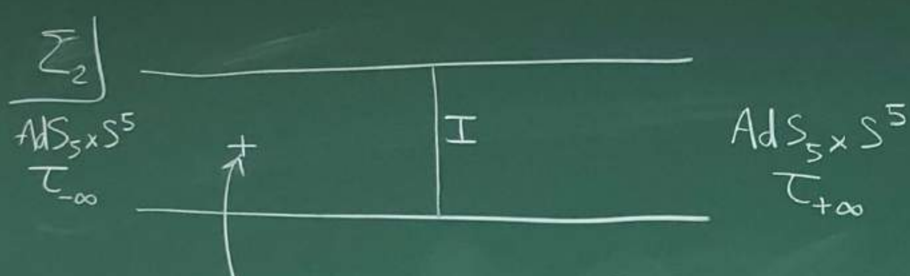
$\Rightarrow$ • J-fold sol.: quotient of Janus sol. [$J \in SL(2,\mathbb{Z})$]
hyperbolic

• S-flip sol.: quotient of AdS$_4$ with localized 5-branes
[$S \in SL(2,\mathbb{Z})$]

Janus sol. $\quad (AdS_4 \times S^2 \times S^2) \times_w \Sigma_2 \simeq AdS_4 \times S^5 \times \mathbb{R}$

strip

[D'Hoker, Estes, Gutperle '07]



$AdS_4 \times S^2 \times S^2$

$I \times S^2 \times S^2 \simeq S^5$

$$\int_{S^5} F_5 \sim N$$

holgraphic to 4d $\mathcal{N}=4$ SYM, $G = U(N)$

+ 3d interface

$\mathcal{N}=4$ SYM	$\mathcal{N}=4$ SYM
$\tau = \tau_{-\infty}$	$\tau = \tau_{+\infty}$

$$\left(\tau = \frac{\theta}{2\pi} + \frac{4\pi i}{g_{YM}^2}\right)$$

(1804.06419)

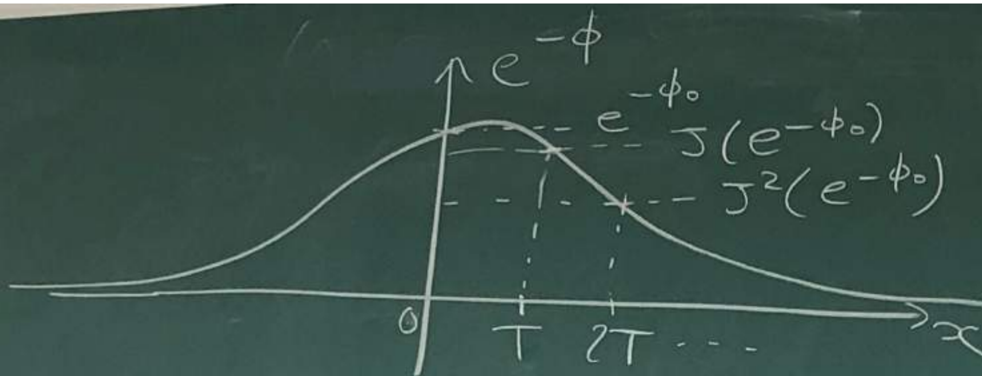
[Inverso, Samtleben, Trigiante]

Idea   Sol. invariant under
$$t_J : \begin{cases} x \longrightarrow x + T \\ J^{-1} \in SL(2,\mathbb{Z}) \end{cases}$$

$\longrightarrow$ Take quotient by t_J

It works for "extremal" Janus: $\tau_{\pm\infty}$ real (modulo $SL(2,\mathbb{Z})$)

$$\tau = C_0 + i e^{-\phi}$$



$$\mathrm{Tr}\, J = 2\cosh(T) \implies \mathrm{Tr}\, J > 2$$

$\nwarrow$ hyperbolic in $SL(2,\mathbb{Z})$

$\Sigma_2)$

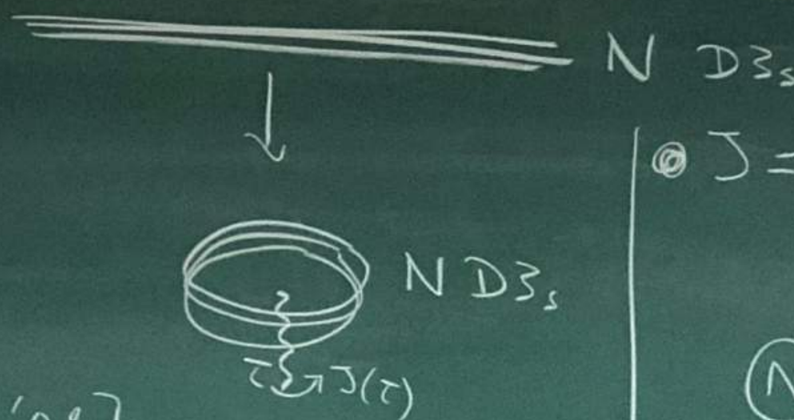
$AdS_4 \times S^5 \times S^1$

3d dual CFTs: $\mathcal{N}=4$

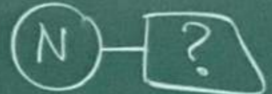
Janus

$\downarrow$ quotient

J-fold sol



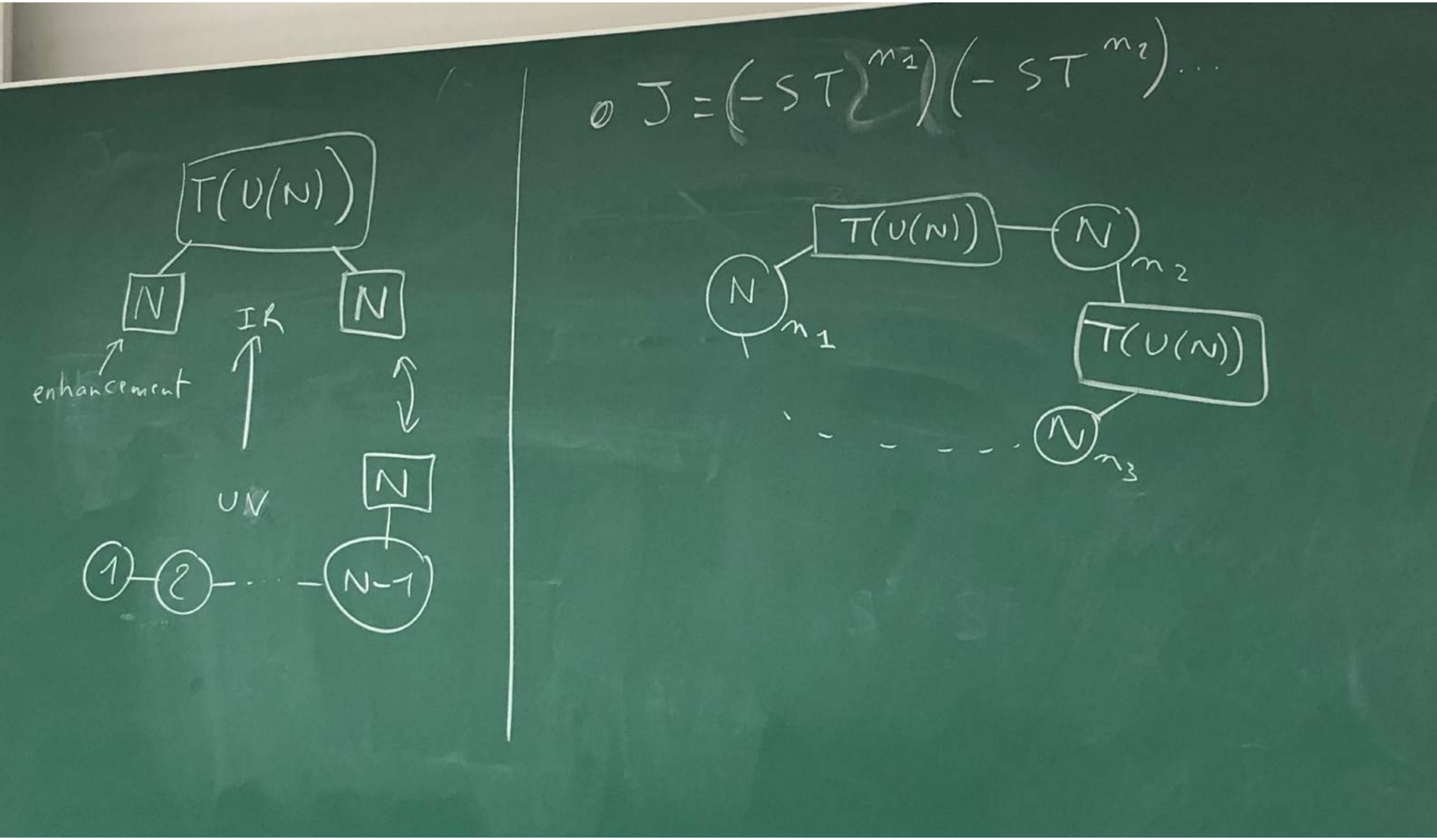
[Gaiotto, Witten '08]



$\leftarrow$ depends on J

$$J = \begin{pmatrix} n & 1 \\ -1 & 0 \end{pmatrix} = -S\,T^n$$

$$S = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \qquad T = \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$$


J = (-ST^n1)(-ST^n2)...
T(U(N))
N
N
IR
enhancement
N
UV
1
2
N-1
T(U(N))
N
N
n1
n2
T(U(N))
N
n3