Orientifold Singularities and Duality

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with Iñaki García Etxebarria (MPI Munich)
and Timm Wrase (Stanford SITP)

1210.7799, 1307.1701
and forthcoming

Review $(\mathcal{N}=4)$

N D3s O3

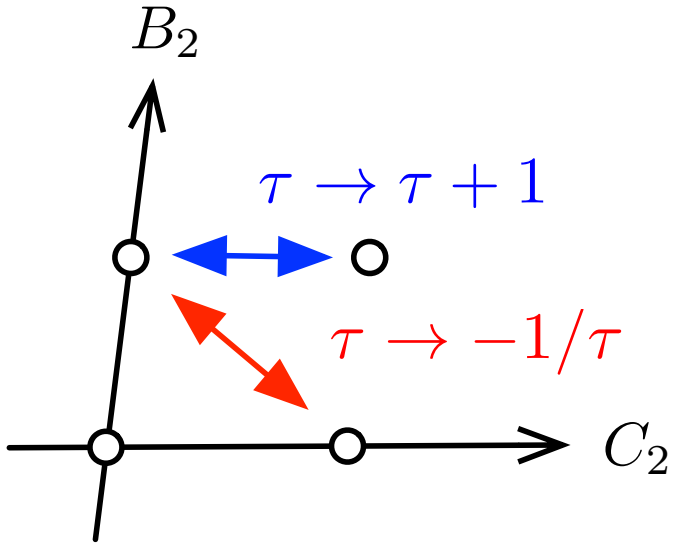
$O3^+$: $USp(2k)$

Montonen-Olive Duality

$O3^-$: $SO(2k)$ $SO(2k+1)$

AdS/CFT description:
(Witten '98)

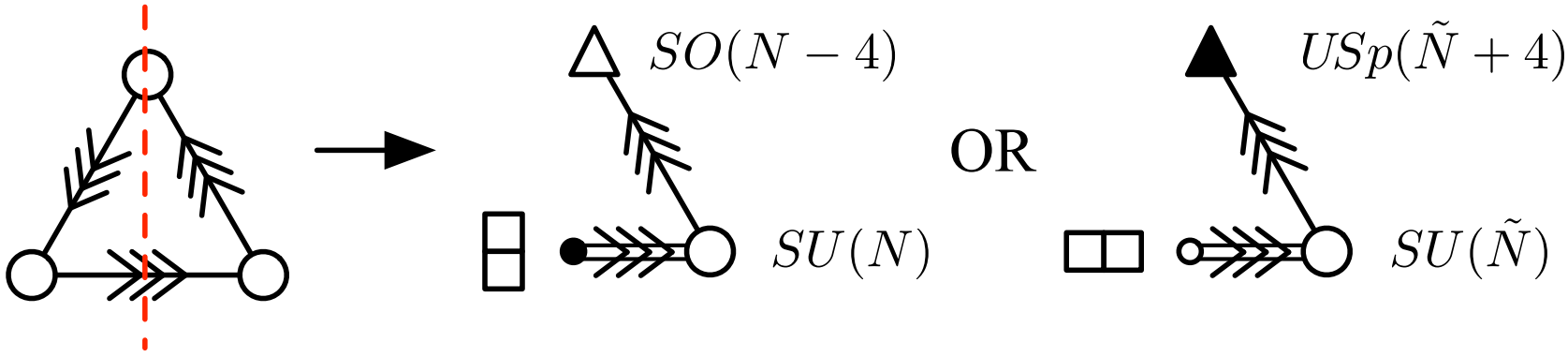
$$H^3(S^5/\mathbb{Z}_2, \tilde{\mathbb{Z}}) \cong \mathbb{Z}_2$$



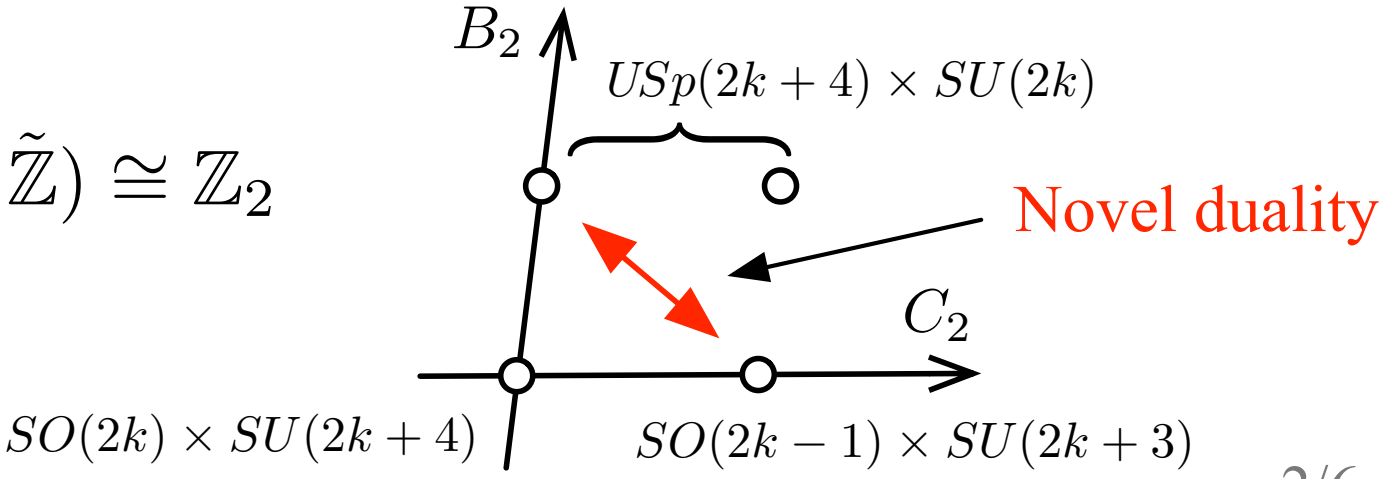
Orbifolds $(\mathcal{N}=1)$

(BH, García-Etxebarria, Wrase '12, '13)

$\mathbb{C}^3/\mathbb{Z}_3 : z^i \to e^{2\pi i/3} z^i \qquad \sigma : z^i \to -z^i$



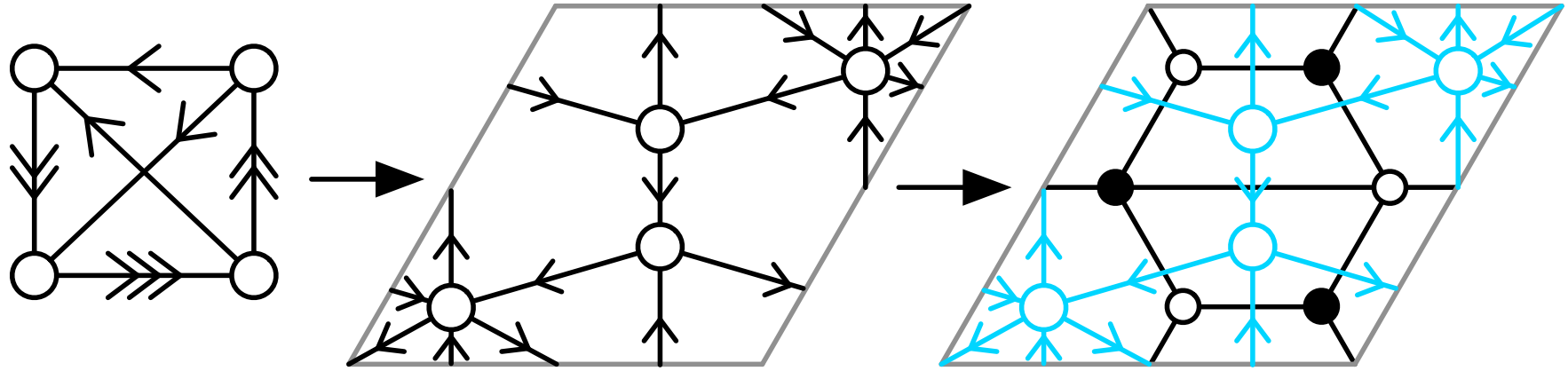
$H^3(S^5/\mathbb{Z}_6, \tilde{\mathbb{Z}}) \cong \mathbb{Z}_2$

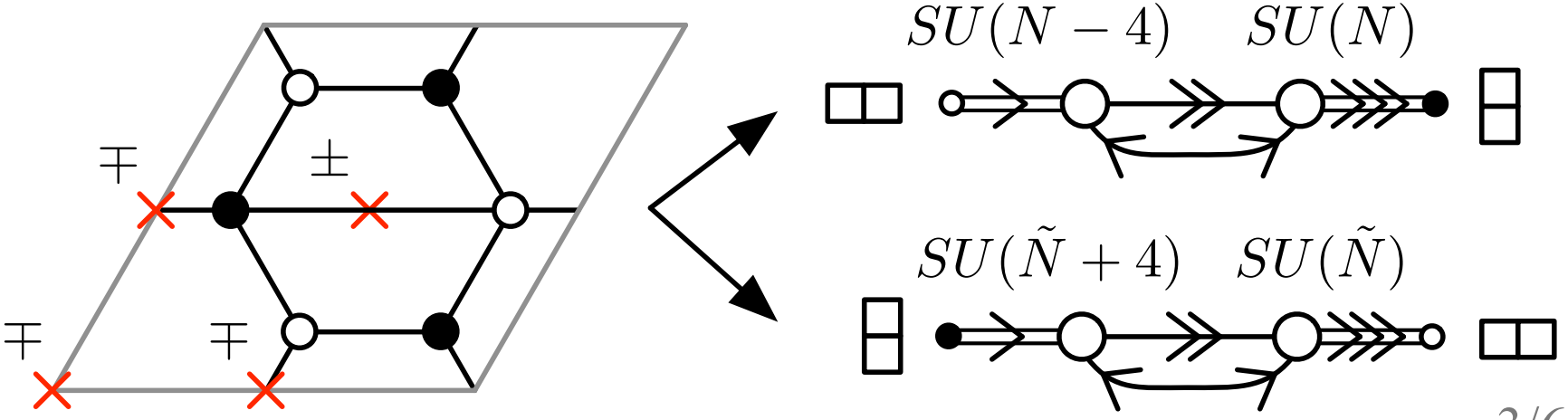


Beyond Orbifolds

dP_1 :

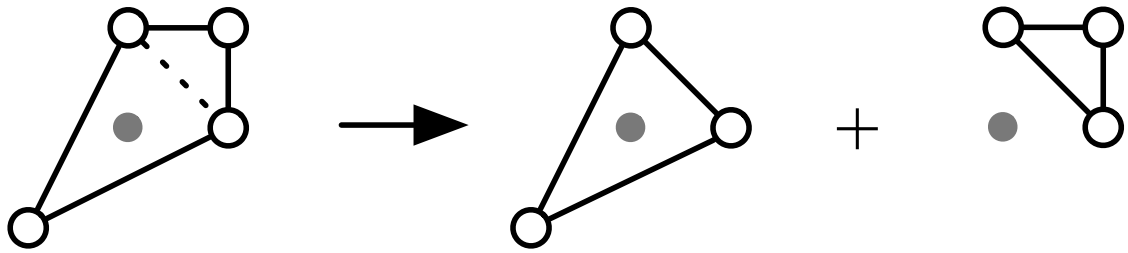
	x	y	z	w
$\mathbb{C}^*$	2	2	-1	-3
$\mathbb{Z}_2$	$-$	$-$	$-$	$+$

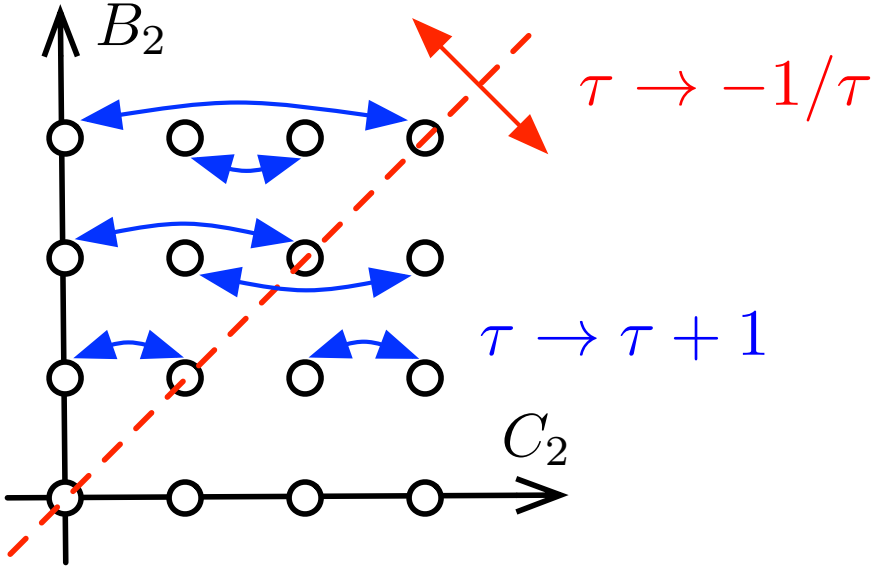


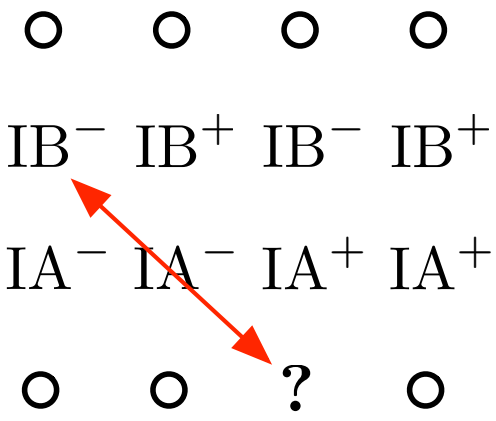


dP_1 Discrete Torsion & Duality

$$H^3\left(\frac{S^3\times S^2}{\mathbb{Z}_2},\tilde{\mathbb{Z}}\right)\cong\mathbb{Z}_2\oplus\mathbb{Z}_2$$

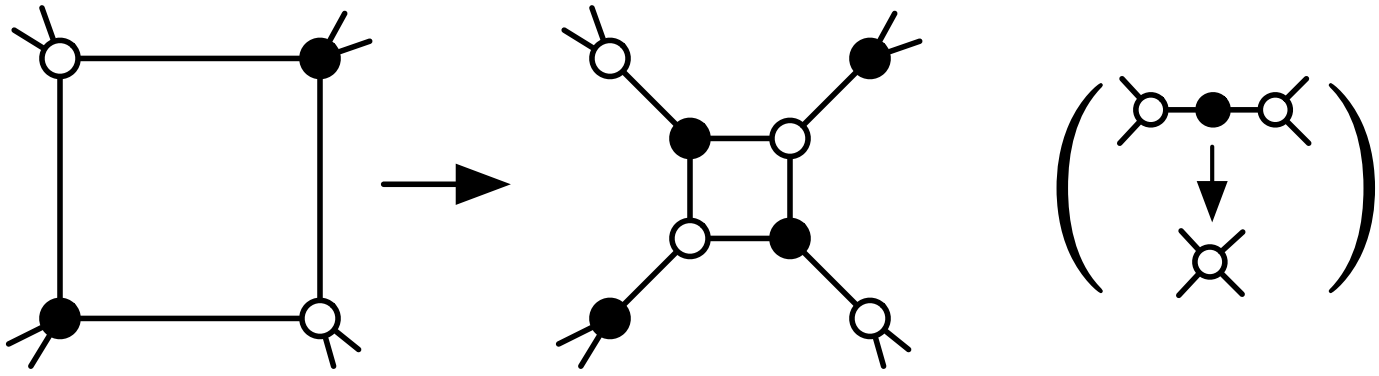






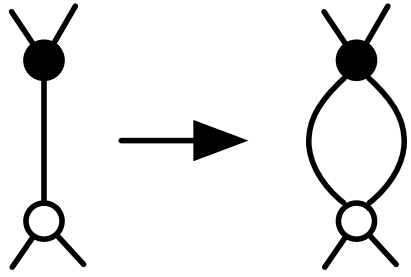
New Involutions from Deconfinement

Seiberg Duality:



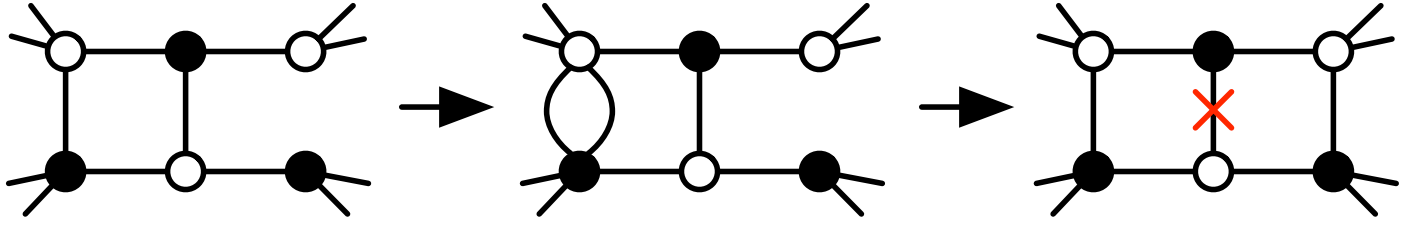
Deconfinement:

(Berkooz '95, Pouliot '95)



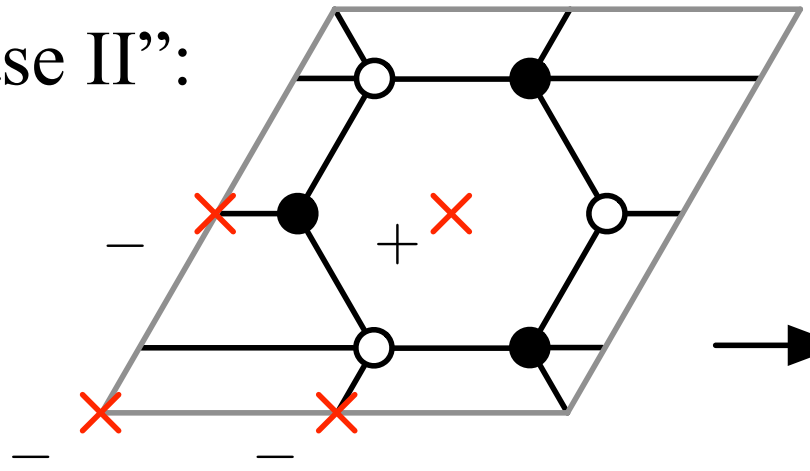
+ flavors

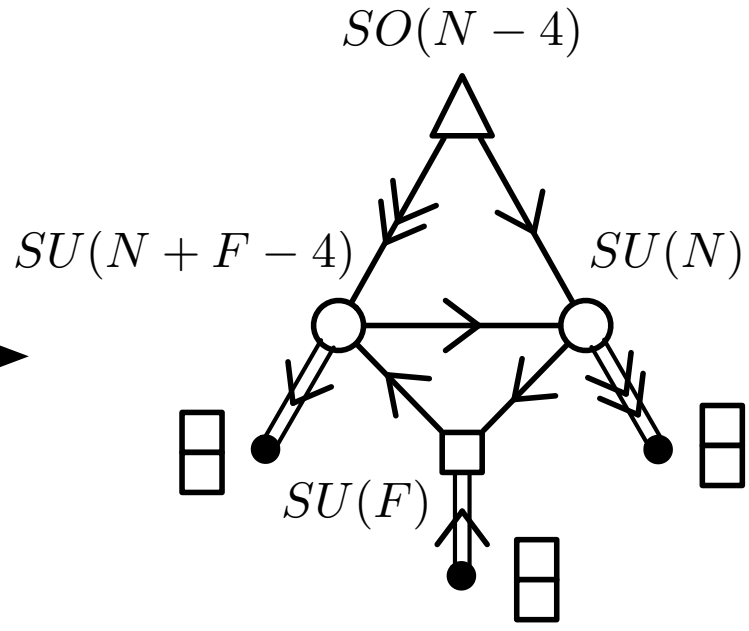
New Involution!

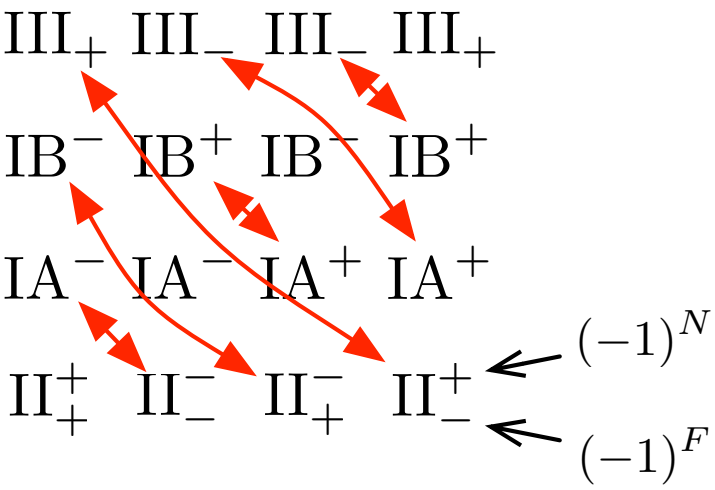


New dP_1 Orientifolds

"Phase II":

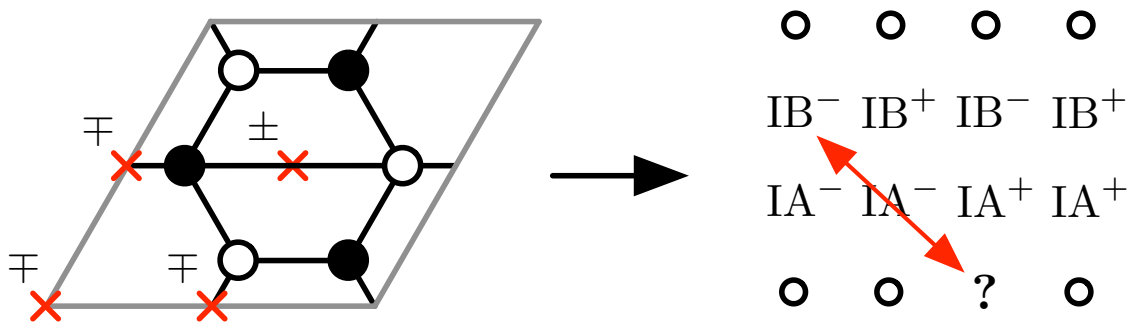




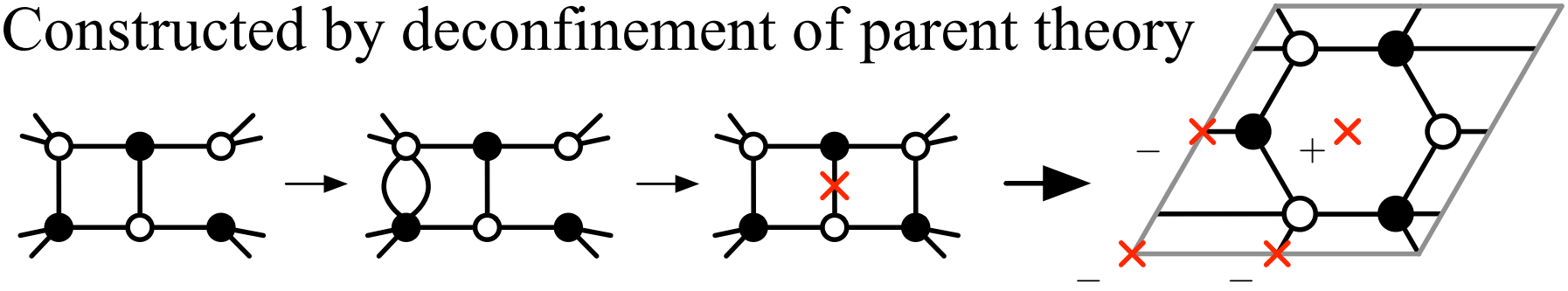


Anomalies, SCI, Low N examples match!

$SL(2,\mathbb{Z})$ covariance requires additional dP_1 orientifolds



Constructed by deconfinement of parent theory



Verified by strong duality checks