The SISSA Group

A zoom on gauge/gravity research in Trieste

Stefano Cremonesi

SISSA/ISAS, TRIESTE

Valencia, October 1, 2007

Professors

- Loriano Bonora — String field theory
- Roberto Iengo — Long massive strings
- Marco Serone — String phenomenology

Researchers

- Matteo Bertolini — Gauge/gravity duality
- Giulio Bonelli — Topological string theory

Post-docs

- Jun-Bao Wu — AdS/CFT
- Jarah Evslin — K-theory classification of branes

Students

- Francesco Benini — Gauge/gravity duality
- Stefano Cremonesi — Gauge/gravity duality
- Davide Forcella — AdS/CFT and geometry
- Diego Gallego — Heterotic string phenomenology
- Houman Safaai — Open/closed string duality

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Overview of the gauge/gravity group at SISSA

- Francesco Benini, SC — Addition of flavors to KW and KS theories
- Matteo Bertolini — Metastable SUSY breaking; Stringy instantons in quiver gauge theories
- Jarah Evslin — Twisted K-theory, calibrations and cascading gauge theories
- Davide Forcella — BPS counting in quiver gauge theories
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Metastable SUSY breaking in gauge/gravity duality

Argurio, Bertolini, Franco, Kachru: hep-th/0610212 ($N_f = N_c$), hep-th/0703236 ($N_f = N_c + 1$)

Gauge theory side (weak λ)

Quiver gauge theories on D-branes at CY singularities:
Susy and metastable non-susy states $\longrightarrow$ ISS

Gravity side (strong λ)

Background with fluxes (and D-branes):
Susy and metastable non-susy states $\longrightarrow$ KS, KPV

- Control on both sides of the duality: common features of metastable susy breaking vacua in the two regimes
- No unnatural small parameters: all dynamically generated

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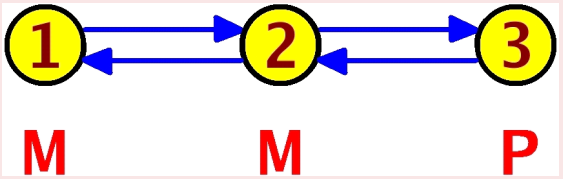
$N_f = N_c$: fractional branes on $\mathbb{Z}_2$ orbifold of the conifold $(xy)^2 = zw$

Duality cascade $\longrightarrow$ 

quartic superpotential (M=P)

Gauge theory analysis:

- BB branch: SUSY vacua
- MM branch: SUSY moduli space
- MB branch: metastable (?) susy breaking vacua

Connection to massive SQCD:

M branch of node 1 $\Longrightarrow$ Node 3: massive SQCD with dynamically generated masses

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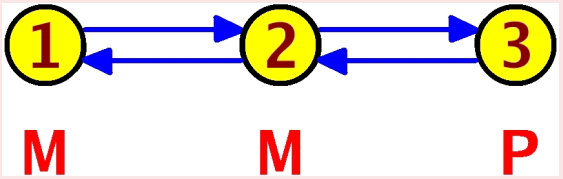
Duality cascade $\longrightarrow$ 

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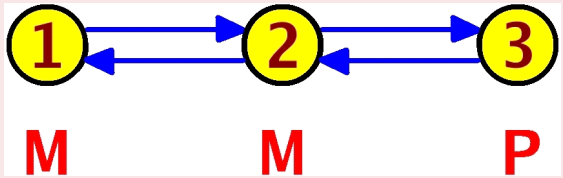
Duality cascade $\longrightarrow$ 

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Gravity dual:

- BB branch: geometric transition to $xy(xy-\epsilon)=zw$
- MM branch: geometric transition to $(xy-\epsilon)^2=zw$ with $\int_A F_3 = P$, $\int_B H_3 = -k$ + P $\mathcal{N}=2$ fractional branes on line of A_1 singularities
- MB branch: non-susy configuration of P $\overline{D3}$ dissolved on P $\mathcal{N}=2$ fractional branes in a background with jumped fluxes $\int_A F_3 = P$, $\int_B H_3 = -(k+1)$

$N_f = N_c + 1$: fractional branes on $\mathbb{Z}_N$ ($N > 3$) orbifold of the conifold

Additional mass term through stringy instanton
Metastability proven in the gauge theory

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