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Flux-induced D-terms in KKLT-like model

Andreas Braun

March 12, 2007

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Uplifting Proposals

It is desirable to decribe SUSY breaking and the uplift as dynamical, i.e. have a correction to the potential understandable in terms of N = 1 SUSY.

There has been interest in using corrections to the Kähler potential to produce dS vacua [Parameswaran,Westphal]

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- It was proposed [Burgess, Kallosh, Quevedo], to use 2-form flux on the world volume of D7-branes. "D-term uplift"
 - D-term potential is of the right form: $\frac{f^2}{(T+\overline{T})^3}$.
 - D7-branes are already part of the underlying flux compactification.

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- F-flatness implies D-flatness:
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Gauge invariance:

- The D-term arises from the gauging of T with X^T = if. This is clearly not compatible with with the Superpotential W = W₀ + Ae^{-aT}!
- ▶ The clash here occurs acually between all three contributions: without W_0 the superpotential changes by a Kähler transformation $W \rightarrow e^H W$.

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6D toy model

It is puzzling why there is an apparent inconsistency between flux and gaugino condensate. [Related work by Kashani-Poor and Tomasiello ; Haack et al.]

• A particular simple model: 6D Supergravity with 2-form flux $F_{56} = f$ compactified on T^2/Z_2 .

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$$-\frac{1}{2}\mathcal{R}_6 - \frac{1}{2}\partial_M\phi\partial^M\phi - \frac{1}{24}e^{2\phi}H_{MNP}H^{MNP} - \frac{1}{4}e^{\phi}F_{MN}F^{MN}.$$

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Stabilizing the model

- A constant piece of superpotential can be introduced through an R-symmetry twist (well known from 5D).
 - ► By itself, it does not introduce an F-term potential, because $K_{i\bar{i}}K^iK^{\bar{j}} = 3.$
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The D-term uplift proposal does not work in a straight forward way.

- Our example, starting from a 6D toy model, naturally evades inconsistencies simply because there are two moduli:
 - ▶ the shift symmetry of *T* is gauged by the flux,
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