Scale-separated (anisotropic) AdS flux vacua

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Introduction

Introduction and motivation

Standard Model versus **General Relativity**

Introduction and Motivation

String Theory

$$D = 10$$

We do **not observe** all of them!

Introduction and motivation

Scale Separation Problem

How can we make contact with our observable d = 4 Universe**?**

Moving towards a specific construction

Anti-de-Sitter vacua

$$L_{\text{int.}} \ll L_{\text{ext.}} \textbf{?}$$

Moving towards a specific construction

Inspired by some **debated** supersymmetric AdS_4 **scale-separated vacua**, e.g.

- The KKLT model [Kachru et alii, 2003];
- The DGKT construction [De Wolfe et alii, 2005],

we search for **simpler** classical scale-separated AdS flux **vacua** [Farakos et alii, 2021; Farakos, MM, Tringas, 2023] in $\mathbf{d = 3}$ dimensions.

AdS_3 flux vacua from IIA orientifolds

Setup [Farakos et alii, 2021]

D = 10 massive type IIA Supergravity

compactified down to

d = 3 Supergravity

on a deformed 7-dimensional torus $\mathbb{T}^7$

Result [Farakos, MM, Tringas, 2023]

Within the regime of validity of the supergravity description, we can:

- produce **anisotropies** among the internal dimensions;
- **tune** the relative magnitude of the radii of $\mathbb{T}^7$ to obtain a **scale-separated** scenario, where e.g. [2304.14372]

$$\{r_i^2\}_{i=1,3,5,7}: \quad \frac{L_i^2}{L_{\rm AdS}^2} \sim N^{-1}\,;$$

$$\{r_i^2\}_{i=2,4,6}: \quad \frac{L_i^2}{L_{\rm AdS}^2} \sim N^{-1-x} \quad \text{with } x > -1\,.$$

Conclusions

Concluding Remarks

Outlook

We constructed new consistent supersymmetric AdS_3 vacua with(out) scale-separation, also being able to create a (considerable) anisotropy within the internal space.

Some possible future directions

Extension to other types of internal spaces. Detailed investigation of 3-dimensional de Sitter uplifts [Work in progress, Farakos et alii]. [...].

Thank you for your interest and attention!