

Branes and Supersymmetry breaking

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Abstract

The lectures will give a pedagogical introduction to various aspects of anti-brane supersymmetry breaking in string theory.

The first part is based on the holographic standpoint meant both as an application to study QFT at strong coupling and as a mean of investigation of bulk physics from a dual perspective. Symmetry and supersymmetry breaking patterns are encoded in the Ward identity structure of a QFT. Holographic models realize such a structure at strong coupling through a precise holographic renormalization program. This setting is suitable to describe neatly supersymmetry breaking at strong coupling and the appearance of the goldstino in a wide and general context. The application of these techniques to cascading gauge theories offers a powerful way to study anti-branes placed in conifold bulk geometries and characterize their supersymmetry breaking.

In the second part we will discuss the dynamics of anti-branes in flux compactifications, their decay channels and the quest for long-lived metastable vacua in string theory. We will cover the following topics:

- The backreaction of anti-branes in warped throats
- Infrared dynamics and vacuum stability
- Applications: de Sitter uplift and black hole microphysics.

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