

Scale separated AdS3 Vacua from String Theory

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Modern theoretical physics suggests that our universe might be just one of many possible solutions allowed by string theory, a leading candidate for a theory of everything. These possible solutions, often called the “string landscape,” describe different ways in which extra dimensions can be compactified so as to produce different physical universes. While much of the focus has traditionally been on four-dimensional vacua, three-dimensional compactifications provide a highly controlled setting to explore deep questions about vacuum structure, stability, and the Swampland constraints.

In this talk, I will present recent work on Type II orientifold flux compactifications to three dimensions, incorporating gauge and metric fluxes, orientifold planes, and D-branes. We focus on a class of models we call RSTU-models, which allow for an effective description via half-maximal gauged supergravity. These models give rise to a rich vacuum structure, including perturbatively stable, both supersymmetric and non-supersymmetric, AdS3 and Minkowski vacua. One of the most exciting results is the discovery of stable, non-supersymmetric AdS3 solutions exhibiting parametrically-controlled scale separation, a feature typically hard to achieve and essential for connecting to real-world physics.

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