

Taxonomy of branes in infinite distance limits

Thursday 10 July 2025 14:42 (17 minutes)

I consider flat slices of moduli space where $(-\nabla\log T)$ -vectors of particle-towers and branes are constant, and I show that the Emergent String Conjecture constrains these vectors to reside on lattices. I further identify conditions that determine whether a given lattice site must be populated, and I show that only a finite set of configurations satisfies these conditions. I classify all such configurations for 0d, 1d, and 2d moduli spaces in theories with 3 to 11 spacetime dimensions, and I argue that 11d is the maximal spacetime dimension compatible with my assumptions. Remarkably, this classification reproduces the detailed particle and brane content of various string theory examples with 32, 16, and 8 supercharges. It also describes some examples where the assumptions I use are violated, suggesting that my assumptions can be relaxed and the scope of this classification can be expanded. It might also predict new branes. For instance, if heterotic string theory is described by this classification, then it must possess non-BPS branes with D-brane-like tensions. Similarly, if this classification applies to the Dark Dimension Scenario with an extra modulus, then it requires strings with a mass scale at or below the twelfth root of the cosmological constant in 4d Planck units. Based on 2505.10615.

Presenter: ETHEREDGE, Muldrow

Session Classification: Parallel Session 1