

Minimal AdS₃

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Abstract

We show that type IIB string theory on $\text{AdS}_3 \times S^3 \times M_4$ with p units of NS flux contains an integrable subsector, isomorphic to the minimal $(p, 1)$ bosonic string. To this end, we construct a topological string theory with target space Euclidean $\text{AdS}_3 \times S^3$. We use a variant of Hamiltonian reduction to prove its equivalence to the minimal $(p, 1)$ string. The topological theory is then embedded in the physical 10-dimensional IIB string theory. Correlators of tachyons in the minimal string are mapped to correlators of spacetime chiral primaries in the IIB theory, in the presence of background 5-form RR flux. We also uncover a ground ring structure in $\text{AdS}_3 \times S^3$ analogous to the well-known ground ring of the minimal string. This tractable model provides a literal incarnation of the idea that the holographic direction of AdS space is the Liouville field. We discuss a few generalizations; in particular, we show that the $N = 4$ topological string on an A_{p-1} ALE singularity also reduces to the $(p, 1)$ minimal string.