Branes and the Swampland

Completeness of the spectrum of charged branes in a quantum theory of gravity naturally motivates the question of whether consistency of what lives on the branes can be used to explain some of the Swampland conditions. In this paper we focus on consistency of what lives on string probes, to show some of the theories with $\mathbb{N}=(1,0)$ supersymmetry in 10d and 6d, which are otherwise consistent looking, belong to the Swampland. Gravitational and gauge group anomaly inflow on these probes can be used to compute the gravitational central charges $(c_L,c_R)$ as well as the level of the group’s current algebra $k_L$. The fact that the left-moving central charge on the string probes should be large enough to allow unitary representations of the current algebra with a given level, can be used to rule out some theories. This in particular explains why it has not been possible to construct the corresponding theories from string theory.

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