Gravitational Background of Alice-Vortices and R7-Branes

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Abstract

R7-Branes are non-supersymmetric codimension-2 defects in IIB superstring theory that were discovered recently, as predicted by the Swampland Cobordism Conjecture. They can be considered as charge conjugation operators, in the sense that the monodromy transformation of wrapping around the brane acts on the gauge potentials by a Z_2 charge conjugation. In this work, we construct codimension-2 vortex solutions in type-IIB supergravity dual to R7-branes, in which monodromy around the vortex enacts a charge conjugation transformation on the axion as C_0 -> - C_0. We find that such solutions necessarily carry an intrinsic dipole and higher-order multipole moments, which provides evidence that the worldvolume theory of an R7-brane is an 8D non-supersymmetric interacting quantum field theory. Based on arXiv:2602.13196

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