D-Branes and the Moduli Space of Fractional Instantons on the Four-Torus

Erich Poppitz

University of Toronto, Physics Department, Canada

Instantons with fractional topological charge in Yang-Mills theory were first found by 't Hooft. It is only in recent years, however, that their relevance for phenomena like confinement and chiral symmetry breaking has come under intense scrutiny. Much of the study of their properties relies on numerical minimization of the Yang-Mills lattice action. The lack of analytic results slows down the their application in physics. Here, we study analytically a class of such solutions using a combination of field theory and string theory tools, which have been very successful in the study of the moduli spaces of integer-charged ADHM instantons. We report on recent work on the local structure of the moduli space obtained via string theory tools and discuss outstanding issues.