

Stony Brook University
The Graduate School

Doctoral Defense Announcement

Abstract

Exploring the BPS/CFT Correspondence

By

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Ever since the groundbreaking work of Seiberg and Witten on the exact low energy dynamics of certain four-dimensional $N=2$ supersymmetric gauge theories, there has been a continuous progress in constructing $N=2$ theories and understanding their dynamics.

The partition function and a class of correlation functions of the theory can be computed exactly on the Omega background using the localization technique. It was later proposed that correlation functions of certain supersymmetry-protected observables can be identified with quantities in two-dimensional conformal field theories or deformations thereof. This remarkable relation is called the BPS/CFT correspondence. Recently, Nekrasov introduced special gauge invariant observables, the qq-characters, and derived an infinite set of non-perturbative Dyson-Schwinger equations.

In this thesis, we explore the BPS/CFT correspondence using qq-characters. In particular, we study a new relation between four-dimensional $N=2$ supersymmetric gauge theory with gauge group $U(N)$ and two-dimensional Yang-Mills theory on a sphere.

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