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Wilson Loops and Chiral Correlators on Squashed Spheres[☆]

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Abstract

After a very brief recollection of how my scientific collaboration with Ugo started, in this talk I will present some recent results obtained with localization: the deformed gauge theory partition function $Z(\vec{\tau}|q)$ and the expectation value of circular Wilson loops W on a squashed four-sphere will be computed. The partition function is deformed by turning on $\tau_J \operatorname{tr} \Phi^J$ interactions with Φ the $\mathcal{N}=2$ superfield. For the $\mathcal{N}=4$ theory SUSY gauge theory exact formulae for Z and W in terms of an underlying $U(N)$ interacting matrix model can be derived thus replacing the free Gaussian model describing the undeformed $\mathcal{N}=4$ theory. These results will be then compared with those obtained with the dual CFT according to the AGT correspondence. The interactions introduced previously are in fact related to the insertions of commuting integrals of motion in the four-point CFT correlator and the chiral correlators are expressed as τ-derivatives of the gauge theory partition function on a finite Ω-background.

1. Introduction and summary

My collaboration with Ugo started around the end of the past century and the beginning of the new one. Before that I had authored few papers on non perturbative results in supersymmetric gauge theories but I did not know how to treat the singularities of the moduli space of the gauge connections and I was looking for someone who could help me sort out what I needed out of a vast mathematical literature in which I did not feel at ease. Pietro Frè, who then was Professor at SISSA adviced me to get in touch with Ugo who, in his words, knew "everything about moduli spaces of gauge connections". So I got in touch with him and we wrote a first paper together [1] in collaboration with A.Tanzini, who later moved to SISSA, and G.Travaglini who were both doing their PhD

[☆] Talk presented by F.Fucito at the conference "Interactions between Geometry and Physics" 17-22 August 2015, Guarujá, Saõ Paulo, Brasil

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