

New recursion relation for M2-brane matrix model

Tuesday, May 21, 2024 1:30 PM (1 hour)

In this talk we study a theory of M2-branes with mass deformations. The Fermi gas formalism allows us to calculate all order $1/N$ corrections to the partition function when mass parameters are small, for which this model is getting attention in various different contexts such as matrix model and integrable systems, precision holography and conformal bootstrap. Recently, motivated by the connection between the Fermi gas system and topological string (TS/ST correspondence) it was found that the partition function satisfies non-linear difference equations such as q-deformed Painleve/Toda equations. By combining this with the three-dimensional dualities we find a new recursion relation, which is a powerful tool to calculate exact values of the partition function for large but finite N . As an application, we reveal the large N asymptotics of the partition function when the mass parameters are large, where the aforementioned $1/N$ expansion is invalid due to the instability of $1/N$ non-perturbative effects interpreted as M2-instantons in the gravity side.

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