

M2-branes and q-Painleve equations

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It is known that the partition function of ABJM theory, the 3d Chern-Simons matter theory on N M2-branes probing C^4/Z_k orbifold, solves a non-linear difference relation called q-deformed Painleve III system. This connection is motivated with the idea of Painleve/gauge correspondence and the topological string/spectral theory correspondence for the quantization of algebraic curves, which also suggests that the similar connection exists for a more general class of M2-brane theories. As a concrete example, we present the connection between the four node circular quiver Chern-Simons theory and the q-deformed Painleve VI system. We also demonstrate how the partition function of this theory reduces to the partition function of the ABJM theory under the coalescence limit of the q-Painleve systems.

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