

Partition function of Argyres-Douglas theories on the blowup

Supersymmetric QFTs can be studied at the non-perturbative level because quantum corrections are under control. In particular, for $\mathcal{N} = 2$ theories the IR dynamics is encoded in the Seiberg-Witten curve which is naturally related to an integrable system. In presence of a self-dual Omega background the integrable system becomes time-dependent and is given by Painlevé equations. We study the Nekrasov partition function of $SU(2)$ gauge theory in 4d on the blowup of spacetime and we show that this gives a new expansion of the Painlevé tau function which encodes interesting physical informations and has special properties in the case of Argyres-Douglas theories.

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Session Classification: Poster Session - Reception