

Antisymmetric Wilson loops in $N = 4$ SYM: from exact results to non-planar corrections

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Wilson loops have played a central role in the development of gauge/gravity dualities. We consider the vacuum expectation values of 1/2-BPS circular Wilson loops in $N=4$ super Yang-Mills theory in the totally antisymmetric representation of the gauge group $U(N)$ or $SU(N)$. Localization and matrix model techniques provide exact, but rather formal, expressions for these expectation values. We extract the leading and sub-leading behavior in a $1/N$ expansion with fixed 't Hooft coupling starting from these exact results. This is done by exploiting the relation between the generating function of antisymmetric Wilson loops and a finite-dimensional quantum system known as the truncated harmonic oscillator.

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Author: CANAZAS GARAY, ANTHONNY FREDDY (UNIVERSIDAD CATÓLICA DE CHILE)

Co-authors: FARAGGI, Alberto (Universidad Andrés Bello); MÜCK, Wolfgang (Universita degli Studi di Napoli "Federico II")

Presenter: CANAZAS GARAY, ANTHONNY FREDDY (UNIVERSIDAD CATÓLICA DE CHILE)

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