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Quark-antiquark Potential from the Quantum Spectral Curve

We construct a closed system of equations describing the quark--anti-quark potential at any coupling in planar $N=4$ supersymmetric Yang-Mills theory. It is based on the Quantum Spectral Curve method supplemented with a novel type of asymptotics. We present a high precision numerical solution reproducing the classical and one-loop string predictions very accurately. We also analytically compute the first 7 nontrivial orders of the weak coupling expansion. Moreover, we study analytically the generalized quark--anti-quark potential in the limit of large imaginary twist to all orders in perturbation theory. We demonstrate how the QSC reduces in this case to a one-dimensional Schrodinger equation. In the process we establish a link between the Q-functions and the solution of the Bethe-Salpeter equation.