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Heavy Quark Potential at Finite Temperature - a Dual Gravity Calculation

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In gauge-gravity duality, the heavy quark potential at finite temperature is usually calculated with the pure AdS background, which does not take care of the renormalization group (RG) running in the gauge theory part. As a consequence, the potential obtained does not yield any confining term in both confined as well as deconfined phase. Following the developments in Klebanov-Strassler geometry, we employ a geometry, which captures the RG flow similar to QCD, to obtain the
complex heavy quark potential by analytically continuing the string configurations into the complex plane. In addition to the attractive terms, the potential has confining terms both at $T = 0$ and $T \neq 0$, compared to the calculations usually done in the literature, where only the Coulomb-like term is present in the deconfined phase. The potential also develops an (negative) imaginary part above a critical separation, $r_c (= 0.53 z_h)$. Moreover, our potential exhibits a behavior different from the usual Debye
screening obtained from perturbation theory.

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