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The high temperature QCD static potential

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It was shown in a certain approximation that dissociation of heavy quark bound states in a quark-gluon plasma occurs due to the emergence of an imaginary part of the potential. We check the robustness of this prediction against corrections. We calculate higher order corrections to the potential in a systematic and rigorous way, in the region where bound states dissociate. This region is dominated by what we call the semi-hard scale, which is smaller than the temperature and larger than the screening mass in natural units. We use a triple expansion in terms of the coupling constant, the semi-hard scale over the temperature, and the screening mass over the semi-hard scale. We have used our result for the beyond leading order potential to calculate the dissociation temperature, and confirmed the validity of the picture that was proposed from the leading order approximation. We compare our results with lattice data.

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