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$T-$Matrix Approach to Quarkonium Correlation Functions in the QGP DANIEL CABRERA, RALF RAPP, Cyclotron Institute and Physics Department, Texas A&M University — We study the evolution of heavy quarkonium states with temperature in a Quark Gluon Plasma (QGP) by evaluating the in-medium $Q\bar{Q}$ $T-$matrix within a reduced Bethe-Salpeter equation in both $S-$ and $P-$wave channels. The underlying interaction kernel is extracted from recent finite-temperature QCD lattice calculations of the singlet free energy of a $Q\bar{Q}$ pair. The bound states are found to gradually move above the $Q\bar{Q}$ threshold after which they rapidly dissolve in the hot system. The $T-$matrix approach is particularly suited to investigate these mechanisms as it provides a unified treatment of bound and scattering states including threshold effects and the transition to the (perturbative) continuum. The $T-$matrix is then applied to calculate $Q\bar{Q}$ spectral functions as well as pertinent Euclidean-time correlation functions which are then compared to results from lattice QCD. The sensitivity to the interplay of bound and scattering states is found to be large. We furthermore investigate the impact of finite-width effects on the single-quark propagators in the QGP as estimated from recent applications of heavy-quark rescattering to RHIC data.

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