High Energy Physics - Phenomenology

Quarkonia and QGP studies

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We summarize results of recent studies of heavy quarkonia correlators and spectral functions at finite temperatures from lattice QCD and systematic T-matrix studies using QCD motivated finite-temperature potentials. We argue that heavy quarkonia dissociation shall occur in the temperature range $1.2 \le T_d/T_c \le 1.5$ by the interplay of both screening and absorption in the strongly correlated plasma medium. We discuss these effects on the quantum mechanical evolution of quarkonia states within a time-dependent harmonic oscillator model with complex oscillator strength and compare the results with data for $R_{\rm AA}/R_{\rm AA}^{\rm CNM}$ from RHIC and SPS experiments. We speculate whether the suppression pattern of the rather precise NA60 data from In-In collisions may be related to the recently discovered X(3872) state. Theoretical support for this hypothesis comes from the cluster expansion of the plasma Hamiltonian for heavy quarkonia in a strongly correlated medium.

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