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Charmonium and bottomonium spectral functions and the heavy quark diffusion coefficient from lattice QCD (15' + 5')

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We investigate charmonium and bottomonium correlation and spectral functions in lattice QCD at finite temperature to understand in-medium properties of charmonia and bottomonia as well as the heavy quark diffusion. Our simulations with the quenched approximation are performed on large isotropic lattices with a couple of lattice spacings towards the continuum limit. At temperatures in a range from $0.73T_c$ to $2.2T_c$ with two different quark masses for charm and bottom we reconstruct spectral functions from Euclidean meson correlation functions. The heavy quark diffusion coefficient can be estimated from behavior of the correlation function for the vector channel at large imaginary time separation as well as low-frequency behavior of the corresponding spectral function. We show temperature and quark mass dependence of the spectral functions and discuss dissociation of charmonia and bottomonia. We also show temperature dependence of the heavy quark diffusion coefficient for the charm and bottom quarks.

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