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Stochastic reconstruction of charmonium spectral functions at finite temperature

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We study charmonium spectral functions at finite temperature by using stochastic reconstruction methods. Our quenched lattice QCD simulations are performed with the standard plaquette gauge and the $O(a)$-improved Wilson fermion actions on $192^3 \times N_\tau$ lattices with N_τ = 96–32, which corresponds to temperatures from $0.73T_c$ to $2.2T_c$. To reconstruct the charmonium spectral functions for the Euclidean time correlators we apply two different stochastic methods called Stochastic Analytical Inference (SAI) and Stochastic Optimization Method (SOM), where the former is based on the Bayes' theorem similar to commonly used Maximum Entropy Method (MEM) while the latter does not rely on any prior information. We carefully estimate systematic uncertainties by comparing results among SAI, SOM and also MEM. With the given spectral functions we discuss melting temperatures of charmonia as well as the heavy quark diffusion coefficient.

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