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Multipoint reweighting method and beta-functions for the calculation of QCD equation of state

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We discuss the reweighting method aiming numerical studies of QCD at finite density, in which the Monte-Carlo method cannot be applied directly. One of the most important problems in the reweighting method is the overlap problem. To solve the problem, we propose the following reweighting method: simulations are performed at several simulation points and the analysis is done combining all data. We explain the method and discuss the improvement of the overlap problem. As an application of the multipoint reweighting method, we compute the meson masses as continuous functions of beta and hopping parameters (κ). Then, lines of constant physics in the (β , κ) space are determined, and the derivatives of the lattice spacing with respect to β and κ are calculated along the lines of constant physics, which are needed for the calculation of the equation of state.

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