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Hadron properties at finite temperature and density with two-flavors of Wilson fermion

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Spatial meson correlators at finite temperature are studied on lattice QCD.

Two-flavor gauge configurations of $16^3 \times 4$ lattice with the RG improved gluon action and the clover-improved Wilson quark action, generated by WHOT-QCD collaboration, are employed [1].

The simulations are performed along the lines of constant physics, on which the mass ratio of pseudo-scalar meson to vector meson, $m_{\text{PS}}/m_{\text{V}}$, is kept constant.

The temperatures of the simulation in the unit of the pseudo-critical temperature, T/T_{PC} , are in the range 0.76-4.0 for $m_{\text{PS}}/m_{\text{V}}=0.65$ and 0.80.

Screening masses of the mesons at finite temperature are extracted from the spatial meson correlators.

Next, meson properties at finite temperature and density are studied by using the Taylor expansion with respect to quark chemical potential. Responses of spatial meson correlators to quark chemical potential are calculated up to second order.

The shifts of meson screening masses due to medium effect are obtained from the responses.

Based on these results, meson properties at finite temperature and density are discussed.

Reference:

[1] Y.Maezawa et al. (WHOT-QCD Collaboration), Phys. Rev. D75, 074501 (2007).

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talk

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