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Polyakov loop augmented 2+1 Flavor Quark Meson Linear Sigma Model and Symmetry Restoration Effects

Content :

We have augmented the generalized 2+1 flavor quark meson linear sigma model
(QMS model) with the inclusion of Polyakov loop potential and studied the
qualitative and quantitative convergence of the masses of chiral
partners in the scalar and pseudo-scalar channel, when the parity doubling
takes place as the temperature is increased and the partial restoration of
chiral symmetry is achieved. We have calculated the results for two different
forms of the effective Polyakov loop potential. The comparison of results with
the existing calculations in the pure 2 + 1 quark meson linear sigma model,
shows that the restoration of chiral symmetry becomes faster and sharper on
account of the inclusion of Polyakov loop potential. We find that inclusion of the
Polyakov loop in quark meson linear sigma model together with the presence of axial
anomaly,triggers an early and significant melting of the strange condensate.
The role of UA (1) anomaly in determining the isoscalar masses and mixing angles
for the pseudoscalar (η and η') and scalar (σ and f0) meson complex, has
also been investigated in the Polyakov quark meson linear sigma model.
The interplay of chiral symmetry restoration effects and the setting up of
UA (1) restoration trend has been discussed and analyzed in the framework
of the presented model calculations.

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