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Thermal resonances and chiral symmetry restoration.

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We analize the role played by the thermal f0(500) state or σ in chiral symmetry restoration and propose an alternative sector (related with the thermal K∗0(700) or κ) to study O(4)×UA(1) restoration. The temperature corrections to the spectral properties of those states are included in order to provide a better description of the scalar susceptibilities χS and χκS around the transition region. We use the Linear Sigma Model to establish the relation between χS and the σ propagator, which is used as a benchmark to test the approach where χS is saturated by the f0(500) inverse self-energy. Within such saturation approach, a peak for χS around the chiral transition is obtained when considering the f0(500) generated as a ππ scattering pole within Unitarized Chiral Perturbation Theory at finite temperature. On the other hand, we show, using Ward Identities, that χκS develops a maximum above the QCD chiral transition, above which it degenerates with χKP in the O(4)×UA(1) restoration region. Such χκS peak can be described when it is saturated with the K∗0(700), which we compute in Unitarized Chiral Perturbation Theory through πK scattering at finite temperature. That approach allows us in addition to examine the χκS dependence on the light- and strange-quark masses. Finally, a comparison with the Hadron Resonance Gas is also studied in this context.

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