

Workshop for young scientists with research interests focused on physics at
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The $f_0(500)$ meson: its role at nonzero density and at nonzero temperature

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We discuss some properties of QCD at nonzero density and nonzero temperature. At nonzero density we describe the emergence of inhomogeneous quark-antiquark condensate in the framework of QCD effective models. We show that such an inhomogeneous condensate is favored at high enough density. In particular, we use an effective hadronic model which makes use of chiral symmetry and includes a light tetraquark/molecular state, the resonance $f_0(500)$. At nonzero temperature we investigate the effect that light scalar mesons have in a thermal gas. We show indeed that these states, such as $f_0(500)$ and the k states, have a negligible influence on the bulk properties of a hadronic gas because of subtle cancellations occurring between attraction and repulsion.

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