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Domain wall network as QCD vacuum: confinement, chiral symmetry, hadronization

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An approach to QCD vacuum as a medium describable in terms of statistical ensemble of almost everywhere homogeneous Abelian (anti-)self-dual gluon fields is briefly reviewed. These fields play the role of the confining medium for color charged fields as well as underline the mechanism of realization of chiral $SU_L(N_f) \times SU_R(N_f)$ and $U_A(1)$ symmetries. Hadronization formalism based on this ensemble leads to manifestly defined quantum effective meson action. Strong, electromagnetic and weak interactions of mesons are represented in the action in terms of nonlocal n -point interaction vertices given by the quark-gluon loops averaged over the background ensemble. New systematic results for the mass spectrum and decay constants of radially excited light, heavy-light mesons and heavy quarkonia as well as electromagnetic form factors are presented. Interrelations between the present approach, models based on ideas of soft wall AdS/QCD, results of functional renormalization group and DSE results, and the picture of harmonic confinement are outlined.

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Summary

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