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On the Nature and Composition of the low-lying scalar mesons

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We follow chiral effective model [1] of a quarkonia nonet and a tetraquark nonet as well as a complex isosinglet (glueball) field to study the lowest lying scalar mesons on the basis of chiral symmetry and UA(1) symmetry. By virtue of the isospin symmetry, the isospin 1 and isospin 1/2 physical states are assumed to have two and four bare quark components whereas $I = 0$ physical scalar and pseudoscalar mesons are assumed to have all the three bare components. We find that the model can accommodate the mass spectra of low-lying states quite well. Based on our result, we will discuss on the nature of the lowest iso-scalar $f_0(600)$ or sigma meson as well as the possible scalar and pseudoscalar glueball candidates.

Referece:

1. Tamal K. Mukherjee, Mei Huang and Qi-Shu Yan, arXiv:1203.5717 [hep-ph].

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