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Light Isosinglet Scalar in Eight Flavor QCD

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The LSD Collaboration has recently completed a study of the light hadron spectrum in $SU(3)$ gauge theory with eight light, degenerate flavors. We have observed that the lightest isosinglet scalar meson, also called the sigma, remains essentially degenerate with the pions even when the (π, σ) multiplet mass scale falls below half the rho meson mass as a function of the input quark mass. This is clearly quite different from QCD with two light flavors. However, we also observe behavior consistent with the vector meson dominance (VMD) hypothesis, which is quite similar to QCD with two light flavors. Finally, we discuss how the presence of a light sigma in the spectrum affects the standard methodology of lattice gauge theory calculations.

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