

## Lowest scalar resonance in QCD

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### Abstract

The lowest scalar hadronic resonance - commonly referred to as  $\sigma$  or  $f_0(600)$  - generated many speculations and controversies. Since a model-independent proof of its existence was missing and such a state is not easily accommodated in the multiplets expected for  $q\bar{q}$  bound states and glueballs, some authors questioned its presence in the QCD spectrum. In a recent work [?] it was demonstrated that the  $\pi\pi$  scattering amplitude has, on the second sheet near the threshold, a pole with the quantum numbers of the vacuum. I briefly present this proof of  $\sigma$  existence, which does not involve models or parametrizations, but relies on the Roy equations which are derived from first principles. I discuss also the calculation of the mass and width of  $\sigma$  and compare our prediction with other values proposed recently in the literature.