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Pion-eta scalar-isovector 3-coupled channel amplitude fitted to branching ratio as and threshold plus subthreshold parameters

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The low energy (below ~ 2 GeV) pi-eta channel interaction amplitude becomes an object of interest mainly because of the search for exotic mesons in just beginning to collect data detector GlueX in Jefferson Lab. Finding and interpretation of expected weak signals from these states require a comparison with a very accurate amplitude containing standard ($q\bar{q}$) states i.e. $a_0(980)$ and $a_0(1450)$. The main problem in the determination of such amplitude is a total absence of data about the phases and inelasticities in the elastic and inelastic region.

In addition, it is necessary to take into account the next two coupled higher channels - KK and $\pi\eta'$. Presented here amplitude is based on separable potential model (working very well for the scalar-isoscalar pi-pi interactions) with only 9 free parameters. To determine such 3-coupled channel amplitude, the following information has been taken into account: experimental branching ratios and positions of both a_0 resonances, theoretical couplings, scattering length from ChPT and value of squared radius of the pi-eta form factor. Phase shifts, inelasticities and cross sections in all single and crossed channels are presented.

Summary

The low energy (below ~ 2 GeV) pi-eta channel interaction amplitude becomes an object of interest mainly because of the search for exotic mesons in just beginning to collect data detector GlueX in Jefferson Lab. Finding and interpretation of expected weak signals from these states require a comparison with a very accurate amplitude containing standard ($q\bar{q}$) states i.e. $a_0(980)$ and $a_0(1450)$. The main problem in the determination of such amplitude is a total absence of data about the phases and inelasticities in the elastic and inelastic region.

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