

Meson Spectroscopy in coherent production off helium-4

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In QCD-based models, the masses of hybrid $q\bar{q}$ states are estimated. The lowest estimated mass of exotic hybrid is in the range below 2 GeV . However, it is not easy to search for this state in this mass region, since this region is highly populated with ordinary mesons. The only way to search for exotic states in this mass region is to determine quantum numbers and select states with certain quantum numbers. The ordinary mesons have quantum numbers $J \geq 1$, $J^{PC} = 1^{+-}, 2^{-+}, \dots$. The quantum numbers of exotics are $J^{PC} = 1^{-+}, 2^{+-}, \dots$ which are forbidden for $q\bar{q}$ states. One of the goals of the eg6 experiment at Jefferson Lab is to study the $\pi^0\eta$ and $\pi^0\eta'$ final states which have $C=+1$ and $P=(-1)^L$, where L is the angular momentum of the system. The L can be determined by analyzing the angular distribution of the decay products of the final states. In case of $L=1$, the produced system will have exotic quantum numbers $J^{PC}=1^{-+}$, which are not possible for ordinary $q\bar{q}$ -bar mesons. In this talk, the status of the $\pi^0\eta$ and $\pi^0\eta'$ final states will be presented.