

“Light Scalar Meson Photoproduction at Jefferson Lab with GlueX”

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The GlueX experiment is one of the cornerstone facilities of the 12 GeV upgrade at Jefferson Lab, and has opened up new opportunities in intermediate-energy nuclear science using real photon beams in conjunction with a large-acceptance detector system. It has been postulated that at the JLab upgrade energies, quark systems beyond the three quark and quark-antiquark systems of baryons and mesons, such as hybrid mesons, tetraquarks and glueballs, should exist, and studies of these systems could shed new light on how quarks combine under the Strong force, particularly the role played by gluons.

Meticulous study of the spectrum of hadronic states is required to further understand the strong force in the non-perturbative energy regime, and the light scalar meson sector is an area that remains poorly understood in this respect. GlueX has already taken new data encompassing final states at energies where photoproduction of these mesons can provide discriminatory evidence between various models, and performing detailed measurements of experimental observables is considered to be a priority of the ongoing research program.

This seminar will give an overview of Jefferson Lab and the GlueX facility in Experimental Hall D, briefly outlining the entire physics program, before focussing on analyses in the light scalar meson sector, culminating in a more detailed discussion of efforts to measure the beam asymmetry of the $a_0(980)$ meson from the reaction $\gamma p \rightarrow \pi\eta$.

