TITLE: Search for exotic-quantum-number mesons with the GlueX experiment

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ABSTRACT:

The primary motivation of the GlueX experiment at Jefferson Lab experimental Hall D is the search for light hybrid mesons that are quark-antiquark pairs coupled to a gluonic field excitation. GlueX uses a ≈ 9 GeV linearly-polarized real photon beam incident on a LH2 target and a solenoid based, large-acceptance detector. The facility completed the initial phase of data taking in 2018 and has many analysis efforts well underway. These studies include searches for the π_1 (1600) hybrid meson with exotic $J^{PC} = 1^{-+}$. There is strong evidence for $J^{PC} = 1^{-+}$ hybrid meson reported from studies of $\eta^{(\prime)}\pi$ systems. Contributions of resonances with different spins in the mass spectrum of the $\eta^{(\prime)}\pi$ system are studied via partial wave analysis, where we use a newly developed model for photo-production via linearly polarized beam. There are parallel studies of $\eta^{(\prime)}\pi$ system, by considering various decay modes ($\gamma p \to p\eta\pi^0, \gamma p \to \Delta^{++}\eta\pi^-, \gamma p \to p\eta^{'}\pi^0, \gamma p \to \Delta^{++}\eta^{'}\pi^-$). The status of these efforts will be reported.

*This work was partially supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under contracts DE-SC0013620 and DE-AC05-06OR23177.