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Photoproduction of hadrons with the GlueX experiment.¹

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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 gluonic field excitation. GlueX uses a ≈ 9 GeV linearly-polarized real photon beam incident on 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 understanding the production mechanisms and potential final states of interest for well-established hadronic states at GlueX beam energies, where little data is available from other photoproduction experiments. There are also ongoing searches for the $\pi_1(1600)$ hybrid meson with exotic $J^{PC} = 1^{-+}$. 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. The status of these efforts will be reported.

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