

Overview of Very Light Meson Results from the GlueX Experiment

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The GlueX experiment in Hall D at Jefferson Lab consists of a well-instrumented photon beamline in conjunction with a solenoidal spectrometer providing near-hermetic coverage for charged particles and photons. Since 2016, the experiment has had several run periods with a 9 GeV linearly polarized photon beam on a 30cm liquid hydrogen target, completing its initial low-intensity program. Light meson studies have been critical to commissioning the GlueX detector, elucidating the photo-production reaction mechanism in this photon energy range, and testing the event selection techniques needed to search for heavier exotic hybrid mesons. We have measured the beam asymmetries for photo-production of pseudo-scalar mesons including π^0 , η , and η' , and have preliminary results for the Spin Density Matrix Elements (SDMEs) for the vector mesons ω , ρ , and ϕ . Cross-section determinations are in progress for all these mesons, usually in more than one decay branch, and with 3-7 particles exclusively detected in the final state. The outlook appears encouraging for GlueX to measure precise, competitive Dalitz plots for $\eta \rightarrow 3\pi$ and $\eta' \rightarrow \eta 2\pi$. The latter $\eta' \rightarrow \eta 2\pi$ studies are synergistic with exploratory studies of the continuum $M(\eta 2\pi)$ spectrum where we plan to search for hybrid exotic mesons.