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BEAM ASYMMETRY FOR LIGHT MESON DECAYS IN GLUEX

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The principal goal of the GlueX experiment at the Thomas Jefferson National Accelerator Facility is to search for non-qbar-q mesons, a construction not allowed by the simple quark model but predicted by Quantum Chromodynamics. Specifically, hybrid mesons, which result from the addition of a constituent gluon and are pictured as a qbar-qg state, will be accessed using the 8-9 GeV linearly polarized photon beam of GlueX and will be mapped as a function of their quantum numbers using partial wave analysis (PWA). Knowing the production mechanism is a key ingredient of PWA and is accessible through the beam asymmetry observable, which was extracted as a function of four-momentum transfer gamma $p \rightarrow$ eta p, gamma $p \rightarrow$ eta-prime p, and gamma $p \rightarrow$ eta Delta+. Results from the full GlueX-I data set (2016-2020) over a wide range of -t have yielded a beam asymmetry close to unity, which indicates that the photoproduction process is dominated by rho and omega exchange.

Keyword-1

beam asymmetry

Keyword-2

photoproduction mechanism

Keyword-3

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