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Partial wave analysis studies with simulated $\eta^{'}\pi^0$ events in GlueX[1]

MARIANA KHACHATRYAN, Florida International University, GLUEX COLLABORATION COLLABORATION — For conventional mesons composed of quark-antiquark pairs certain J^{PC} quantum numbers are not allowed and are called exotic, where J is the total angular momentum of the system and P and C correspond to parity and charge conjugation. Our understanding of how quarks form mesons has evolved within quantum chromodynamics (QCD) and we expect a richer spectrum of mesons by taking into account also gluonic degrees of freedom. This spectrum includes hybrid mesons that are quark-antiquark pairs coupled to gluonic field excitation that can have non-exotic J^{PC} quantum numbers. There is experimental evidence for the π_1 hybrid meson with exotic $J^{PC} = 1^{-+}$. The primary motivation of the Jefferson Lab GlueX experiment is the search for light hybrid mesons. Contributions of resonances with different spins in mass spectrum of the $\eta^{'}\pi^0$ system can be studied via partial wave analysis (PWA). We use a newly developed model for photo-production via linearly polarized beam to describe the decomposition of the reaction amplitude in terms of partial waves corresponding to different resonances. The goal of the present study is to develop a strategy for the search for the π_1 (1600) exotic meson via PWA with simulated data for the $\eta^{'}\pi^0$ system.

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