

GlueX: Photoproduction of Hybrid Mesons

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The goal of the GlueX experiment [1] is to provide critical data to help understand the soft gluonic field responsible for binding quarks in hadrons. Hybrid mesons, and in particular exotic hybrid mesons, provide the ideal laboratory for testing QCD in the confinement regime since these mesons explicitly manifest the gluonic degrees of freedom. Photoproduction is expected to be particularly effective in producing exotic hybrids but there is little data on the photoproduction of light mesons. GlueX will use the new 12-GeV electron beam to produce a 9-GeV beam of linearly polarized photons using the technique of coherent bremsstrahlung. A solenoid-based hermetic detector is under construction, which will be used to collect data on meson production and decays. These data will also be used to study the spectrum of conventional mesons, including the poorly understood excited vector mesons. This talk will describe the latest theoretical developments [2] to help understand how the data of hybrid mesons can provide insights into the fundamental theory of strong interactions.

[1] JLab Experiment E12-06-102, *Mapping the Spectrum of Light Quark Mesons and Gluonic Excitations with Linearly Polarized Photons*, <http://www.jlab.org/exp-prog/proposals/06/PR12-06-102.pdf>.

[2] J.J. Dudek *et al.* (Hadron Spectrum Collaboration), Phys. Rev. D **10**, 034508 (2010).

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