Search for Exotic Hadrons in $\eta^{(\prime)}\pi$ at GlueX

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March 13, 2024

Abstract

Quantum Chromodynamics (QCD) provides a theoretical framework for understanding interactions among quarks and gluons within hadrons. Yet, the influence of gluonic excitations on hadron characteristics and structure remains uncertain. Recent discoveries of potentially exotic hadrons underscore the need for precise spectroscopic measurements to decipher the strong force. This discussion focuses on ongoing analyses using photoproduction data from the GlueX experiment at Jefferson Lab, with emphasis on $\eta^{(\prime)}\pi$ systems. Specifically, we explore the production mechanisms of the $a_2(1320)$ mesons in these channels, a step toward unveiling exotic quantum-number hybrid mesons. Furthermore, the discussion will cover the application of an amplitude analysis utilizing the polarized photon beam of the GlueX experiment, to identify the lightest hybrid mesons.