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Resolving Difficulties of a Single-Channel Partial-Wave Analysis[1]

BRIAN HUNT, D. MARK MANLEY, Kent State University — The goal of our research is to determine better the properties of nucleon resonances using techniques of a global multichannel partial-wave analysis. Currently, many predicted resonances have not been found, while the properties of several known resonances are relatively uncertain. To resolve these issues, one must analyze many different reactions in a multichannel fit. Other groups generally approach this problem by generating an energy-dependent fit from the start. This is a fit where all channels are analyzed together. The method is powerful, but due to the complex nature of resonances, certain model-dependent assumptions have to be introduced from the start. The current work tries to resolve these issues by first generating single-energy solutions in which experimental data are analyzed in narrow energy bins. The single-energy solutions can then be used to constrain the energy-dependent solution in a comparatively unbiased manner. Our work focuses on adding three new single-energy solutions into the global fit. These reactions are $\gamma p \to \eta p$, $\gamma n \to \eta n$, and $\gamma p \to K^+\Lambda$. During this talk, I will discuss the difficulties of this approach, our methods to overcome these difficulties, and a few preliminary results.

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