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**Model Selection in the Analysis of Photoproduction Data** JUSTIN LANDAY[1], George Washington University — Scattering experiments provide one of the most powerful and useful tools for probing matter to better understand its fundamental properties governed by the strong interaction. As the spectroscopy of the excited states of nucleons enters a new era of precision ushered in by improved experiments at Jefferson Lab and other facilities around the world, traditional partial-wave analysis methods must be adjusted accordingly. In this poster, we present a rigorous set of statistical tools and techniques that we implemented; most notably, the LASSO method, which serves for the selection of the simplest model, allowing us to avoid over fitting. In the case of establishing the spectrum of exited baryons, it avoids overpopulation of the spectrum and thus the occurrence of false-positives. This is a prerequisite to reliably compare theories like lattice QCD or quark models to experiments. Here, we demonstrate the principle by simultaneously fitting three observables in neutral pion photo-production, such as the differential cross section, beam asymmetry and target polarization across thousands of data points.

[1]Other authors include Michael Doring, Bin Hu, and Raquel Molina

Justin Landay
George Washington University

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