Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Disentanglement of Electromagnetic Baryon Properties[1] DANIEL SADASIVAN, George Washington Univ, MICHAEL DORING, George Washington Univ. and Thomas Jefferson Accelerator Facility — Through recent advances in experimental techniques, the precise extraction of the spectrum of baryonic resonances and their properties becomes possible. Helicity couplings at the resonance pole are fundamental parameters describing the electromagnetic properties of resonances and enabling the comparison of theoretical models with data. We have extracted them from experiments carried out at Jefferson Lab and other facilities using a multipole analysis within the Julich-Bonn framework. Special attention has been paid to the uncertainties and correlations of helicity couplings. Using the world data on the reaction $\gamma p \to \eta p$, we have calculated, for the first time, the covariance matrix. Our results are useful in several ways. They quantify uncertainties but also correlations of helicity couplings. Second, they can tell us quantitatively how useful a given polarization measurement is. Third, they can tell us how the measurement of a new observable would constrain and disentangle the resonance properties which could be helpful in the design of new experiments. Finally, on the subject of the *missing resonance problem*, model selection techniques and statistical tests allow us to quantify the significance of whether a resonance exists.

[1]Supported by NSF CAREER grant no. PHY-1452055, NSF PIF grant no. 1415459, by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under contract DE-AC05-06OR23177, and by Research Center Julich through the HPC grant jikp07.

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Date submitted: 01 Oct 2016 Electronic form version 1.4