# Curriculum Vita

# Michael R. Dugger

(Prepared March 12, 2023)

College of Integrative Sciences and Arts Arizona State University 6073 S. Backus Mall Mesa, AZ 85212-6420

# Telephone: (480)727-1109 email: dugger@asu.edu

# Professional preparation

	Institution	Major/Conc.	Degree, Year
Undergraduate:	Northern Arizona State University	Physics/Mathematics	B.S., 1993
Graduate:	Arizona State University	Physics	Ph.D., 2001
Postdoctoral:	Arizona State University	Physics	2002-2006

### **Appointments**

Associate Professor (tenure-track)	Arizona State University	2017 to present
Associate Research Professor	Arizona State University	2013-2017
Assistant Research Professor	Arizona State University	2006-2013
Postdoctoral Research Associate	Arizona State University	2002-2006

## Research grants

**2022-2025**: Department of Energy **grant renewal** for "Experimental Medium Energy Physics at Arizona State University" (PI: M. Dugger, 100%, award number DE-SC0020404, award amount: \$506,000 (received thus far: \$149,000)

**2019-2022**: Department of Energy grant "Experimental Medium Energy Physics at Arizona State University" (PI: M. Dugger, 100%, award number DE-SC0020404, award amount: \$450,000)

**2013-2018**: National Science Foundation grant "Meson Physics at Arizona State University" (PI: B.G. Ritchie 50%, Co-PI: M. Dugger 50%, award number PHY-1306737, award amount: \$530,000)

**2010-2013**: National Science Foundation grant "Meson Physics at Arizona State University" (PI: B.G. Ritchie 50%, Co-PI: M. Dugger 50%, award number PHY-0969201, award amount: \$510,000)

**2007-2010**: National Science Foundation grant "Meson Physics at Arizona State University" (PI: B.G. Ritchie 33%, Co-PI: E. Pasyuk 33%, Co-PI: M. Dugger 33%, award number PHY-0653630, award amount: \$480,000)

#### Honors and Awards

2002: Mark Anderson Outstanding Doctoral Thesis Award

1993: Vesto Melvin Slipher Scholarship in the Sciences

1992: Northern Arizona University, Department of Physics Achievement Award

## Teaching experience

### 2017-present: Arizona State University, Polytechnic Campus, Mesa, AZ

- PHY 112 General Physics II
- PHY 121 University Physics I
- PHY 131 University Physics II
- PHY 252 University Physics III
- PHY 321 Vector Mechanics and Vibrations
- PHY 331 Principles of Modern Electromagnetism
- PHY 394 Basics of Medical Physics
- PHY 456 Lasers Optics
- PHY 493 Honors Thesis
- PHY 495 Project Research
- PHY 499 Individualized Instruction

# 2016: Arizona State University, West Campus, Glendale, AZ

PHY 113 - University Physics Lab I

### 1994-2016: Arizona State University, Tempe Campus, Tempe, AZ

- PHY 101 Introduction to Physics
- PHY 111 Recitation for General Physics I
- PHY 112 Recitation for General Physics II
- PHY 113 General Physics Lab I
- PHY 132 University Physics Lab I
- PHY 361 Recitation for Introduction to Modern Physics
- PHY 495 Project Research
- PHY 499 Individualized Instruction

#### Former Ph.D. students

#### Brandon Sumner, Ph.D. thesis defended on April 11, 2022, ASU

Title: Study of Excited Cascade Baryons and Preliminary Cross-Sections for  $\Xi(1530)$  Using Data from the GlueX Experiment

Awards and Fellowship:

- NSF Postdoctoral Fellow (MPS Ascend), 2022-2025
- ASU Department of Physics Outstanding Graduate Student Award, May, 2022
- ASU College of Liberal Arts and Sciences Outstanding Graduate Student Award, May, 2022

#### Sebastian Cole, Ph.D. thesis defended on July 2, 2021, ASU

Title: Partial Wave Analysis of Meson Resonances That Decay  $K^*\overline{K}$  Using Data from the GlueX Experiment

Award:

• ASU College of Integrative Sciences and Arts Outstanding Graduate Student Award, December, 2020

### Additional mentoring

## Sponsoring Scientist for Postdoctoral Fellow

• Brandon Sumner, NFS Postdoctoral Fellow (MPS Ascend), 2022-present

#### Adviser for Ph.D. students:

• Alan Gardner (August 2020-present)

Project: Survey of mesons that decay to  $K^+K^-\pi^0$  states in GlueX data

• Katelyn Hernandez (December 2022-present)

Project: Survey of  $\Xi$  baryons in GlueX and CLAS12 data

#### Chair of Honors Thesis Committee:

• Robert Lee (2017-2018)

Project: Extraction of H and P Observables for  $\gamma p \to \pi^+ n$ 

Awards during mentorship:

- CLAS Dean's Medalist, May 2018
- Barrett Honors College Senior Project Award in Physics, May 2018
- Physics Department Outstanding Undergraduate Award, May 2018
- John and Richard Jacob Award for Undergraduate Research Award, May 2018
- Patrick Walker (2020-2021)

Project: Meson decay in  $ep \to epK^+K^-$  and  $ep \to epK^+K^-\pi^0$  events Award during mentorship:

- ASU Department of Physics Undergraduate Research Award, spring 2021
- Rebeca Osar (2019-present)

Project: Search for excited  $\Lambda$  states

### Primary mentor for the following undergraduates:

• Shep Bryan (2017-2018)

Project: Simulation of CLAS12 detector

• Eric Bryan (2018)

Project: Particle ID studies

• Mohamed (2019-2020)

Projects: Simulations studies of therapy beams, and Particle ID studies Award during mentorship:

- College of Integrative Sciences and Arts Undergraduate Research Award, May 2020
- Kevin Scheuer (2019-2020)

Project: Machine learning methods for  $K\pi$  identification

• Emily Lamagna (2021)

Project: Invariant mass of the  $\phi \pi^0$  System

• Anna Costelle (2021)

Project: Construction of Event Generators for Strangeness-Containing Final States Award during mentorship:

- ASU Women in Physics Award for Undergraduate Research, May 2021
- Joshua Grumski-Flores (2021-2022)

Project: Simulation of Pair Spectrometer

Award during mentorship:

- Department of Physics Research Award, spring 2022
- Shane Watters (2021-2022)

Project:  $\Lambda$  detection efficiency using the CLAS12 detector

• Randy Montoya (2022)

Project: Simulation, and machine-learning diagnostics of brain cancer

• Luis Dorantes (2022-present)

Project: Simulation and tomography of CT-scan data

• Joshua Russell (2022-present)

Project: Using CLAS12 data to reconstruct ground-state  $\Xi$  baryon

#### Service 2017-present

#### **Profession**

- Chaired the Nuclear Physics session of the 2020 American Physical Society Four Corners Meeting
- Member of the International Advisory Committee for the MENU (Meson Nucleon) 2019 Conference.
- Review Committee member of the MENU 2019 Conference.
- Review Committee member of the 2018 Division of Nuclear Physics, Conference Experience for Undergraduates.
- Reviewer for Physical Review Letters (2018).
- Reviewer for Physical Reviews C (2017,2020).

#### University

- Poly Science and Mathematics (PSM) Safety Committee 2021-present
- Member of the Faculty Review Committee for the 2023 Graduate College Enrichment Fellowship.
- Member of the Graduate College review committee for the 2023 Completion Fellowship.
- Member of the Graduate College review committee for the 2022 ARCS (Achievement Rewards for College Scientists) Fellowship.
- Member of the Graduate College review committee for the 2020 Completion Fellowship.
- Member of the Graduate College review committee for the 2019 ARCS Fellowship.
- Member of the Graduate College review committee for the 2018 Completion Fellowship.

#### Invited talks

- 1. CLAS baryon spectroscopy programme, The 13th International Workshop on the Physics of Excited Nucleons,  $N^*$  2022, Santa Margherita Ligure, Italy, October 18, 2022
- 2. Overview of Spectroscopy Results in Meson Photoproduction with Polarization Observables, XVI International Conference on Hadron Spectroscopy, HADRON 2015, Newport News, Virginia, September 14, 2015
- 3. Latest results from the CLAS  $N^*$  polarization program, American Physical Society, Denver, Colorado, April 16, 2013
- 4. First data from FROST, JLab Users Group Meeting, Jefferson Lab, Newport News, Virginia, June 8, 2011

- 5. Non-strange pseudoscalar photoproduction from the proton, Seminar at Idaho State University, Pocatello, ID, April 15, 2010
- 6.  $\Sigma$  for  $\gamma p \to p \pi^0$ ,  $n \pi^+$  and  $p \eta$  from CLAS g8b run period with 0.95 GeV  $< E_{\gamma} < 1.2$  GeV, Narrow Nucleon Resonances Workshop, University of Edinburgh, Scotland, June 8, 2009
- 7. Pseudoscalar meson photoproduction with CLAS, George Washington University Nuclear Physics Seminar, Washington D.C., March 11, 2008
- 8. Photoproduction of  $\eta$  and  $\eta'$  Mesons from the Proton, The eleventh International Conference on Meson-Nucleon Physics and the Structure of the Nucleon, MENU 2007, Juelich, Germany, September 10, 2007
- 9. S=0 pseudoscalar photoproduction from the proton, The fifth annual International Workshop on Physics of Excited Nucleons,  $N^*$  2005, Tallahassee, Florida, October 14, 2005

#### Scholar Metric

H-index from Web of Science = 45

### Publications in refereed journals

The CLAS collaboration stands for CEBAF (Continuous Electron Beam Accelerator Facility) Large Acceptance Spectrometer, and articles from that collaboration list the lead authors first and then subsequent authors by alphabetical order. The GlueX collaboration obeys a strict alphabetical listing for all authors included on any paper. The publications since 2017 have been annotated. Some of the annotations will be common to several papers. In order to reduce clutter, I have defined the following comment types:

- A: This is a GlueX Collaboration paper. I participated in data-taking activities.
- B: This is a CLAS Collaboration paper. I participated in data-taking activities.
- C: I provided the photon-polarization measurements and led in the construction, operation and maintenance of the photon polarimeter.
- D: I assisted in the construction, operation and maintenance of the bremsstrahlung photon tagger required for the determination of the incident photon energy and incident flux.
- E: These measurements were from a run group named FROST. I was a co-spokesperson and very active member of FROST. I created the momentum corrections used by the FROST group and contributed often to weekly FROST meetings.
- F: These measurements were from a run group named g8b. I was a very active member of g8b.
- G: I provided corrections to, and systematic error calculations for, the beam-polarization determined by the coherent bremsstrahlung spectral analysis performed by the Glasgow University Group.
  - I. I. Strakovsky, W. J. Briscoe, O. Cortes Becerra, M. Dugger, G. Goldstein, V. L. Kashevarov, A. Schmidt, P. Solazzo and B.-G. Yu, Pseudoscalar and scalar meson photoproduction interpreted by Regge phenomenology, Phys. Rev. C 107 (2023), p. 015203

Annotation: This is a theoretical paper and I assisted in characterizing prior experiments.

2. S. Adhikari et al., Measurement of spin density matrix elements in  $\Lambda(1520)$  photoproduction at 8.2–8.8 GeV 105 (2022) (3)

Annotation: Comment type: A and C.

3. S. Diehl et al., Multidimensional, High Precision Measurements of Beam Single Spin Asymmetries in Semi-inclusive π<sup>+</sup> Electroproduction off Protons in the Valence Region, Physical Review Letters 128 (2022) (6)

Annotation: Comment type: B.

4. S. Adhikari et al., Search for photoproduction of axionlike particles at GlueX, Physical Review D 105 (2022) (5)

Annotation: Comment type A.

5. N. Zachariou et al., Beam-spin asymmetry  $\Sigma$  for  $\Sigma$ - hyperon photoproduction off the neutron, Physics Letters B **827** (2022), p. 136985

ANNOTATION: Comment type B and D.

6. U. Shrestha et al., Differential cross sections for  $\Lambda(1520)$  using photoproduction at CLAS, Physical Review C 103 (2021) (2)

Annotation: Comment type B and D.

7. N. Zachariou et al., Double polarisation observable G for single pion photoproduction from the proton, Physics Letters B 817 (2021), p. 136304

Annotation: Comment type B, D and E.

8. S. Adhikari et al., Measurement of beam asymmetry for  $\pi^-\Delta^{++}$  photoproduction on the proton at  $E_{\gamma} = 8.5$  GeV, Physical Review C **103** (2021) (2)

Annotation: Comment type A, C and I assisted in the use of a Fourier analysis technique I developed for the extraction of beam asymmetries.

9. T. Hayward et al., Observation of Beam Spin Asymmetries in the Process ep  $\rightarrow e\pi^+\pi^-X$  with CLAS12, Physical Review Letters 126 (2021) (15)

Annotation: Comment type B.

10. M. Carver et al., Photoproduction of the  $f_2(1270)$  Meson Using the CLAS Detector, Physical Review Letters **126** (2021) (8)

ANNOTATION: Comment type B and D.

11. S. Adhikari et al., The GlueX beamline and detector, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 987 (2021), p. 164807

Annotation: I assisted in writing the text regarding the triplet polarimeter

12. T. Hu et al., Photoproduction of  $\eta$  mesons off the proton for  $1.2 < E_{\gamma} < 4.7$  GeV using CLAS at Jefferson Laboratory, Physical Review C 102 (2020) (6)

Annotation: Comment type B and D.

13. A. Celentano et al., First measurement of direct photoproduction of the  $a_2^0(1320)$  meson on the proton, Physical Review C **102** (2020) (3)

Annotation: Comment type B and D.

14. S. Adhikari et al., Measurement of the photon beam asymmetry in  $\vec{\gamma}p \to K^+\Sigma^0$  at GeV, Physical Review C **101** (2020) (6)

Annotation: Comment type A and C.

15. A. Schmidt et al., Probing the core of the strong nuclear interaction, Nature 578 (2020) (7796), pp. 540–544

Annotation: Comment type B.

16. S. Adhikari et al., Beam asymmetry  $\Sigma$  for the photoproduction of  $\eta$  and  $\eta'$  mesons at  $E_{\gamma} = 8.8 \ GeV$ , Physical Review C **100** (2019) (5)

Annotation: Comment type A and C.

17. A. Ali et al., First Measurement of Near-Threshold  $J/\Psi$  Exclusive Photoproduction off the Proton, Physical Review Letters 123 (2019) (7)

Annotation: Comment type A and I provided the preliminary event-generator code of the expected electron-positron pair-production background. The event generator was a modification of my triplet production generator code used for the triplet polarimeter.

18. P. Roy et al., First Measurements of the Double-Polarization Observables F,P and H in  $\omega$  Photoproduction off Transversely Polarized Protons in the Resonance Region, Physical Review Letters **122** (2019) (16)

Annotation: Comment type B, D, E and I assisted in the construction of the azimuthal dependence of the event-by-event background subtraction method used.

19. E. Golovatch et al., First results on nucleon resonance photocouplings from the  $\gamma p \to \pi^+\pi^- p$  reaction, Physics Letters B **788** (2019), pp. 371–379

Annotation: Comment type B, D and my measurements of  $\pi^+$  photoproduction helped determine the starting off point for determination of the reported photocouplings.

20. M. C. Kunkel et al., Exclusive photoproduction of  $\pi^0$  up to large values of Mandelstam variables s,t and u with CLAS, Physical Review C **98** (2018) (1)

Annotation: Comment type B and D.

21. J. Bono et al., First measurement of Ξ<sup>-</sup> polarization in photoproduction, Physics Letters B **783** (2018), pp. 280–286

ANNOTATION: Comment type B and D.

22. P. Roy et al., Measurement of the beam asymmetry  $\Sigma$  and the target asymmetry T in the photoproduction of  $\omega$  mesons off the proton using CLAS at Jefferson Laboratory, Physical Review C 97 (2018) (5)

Annotation: Comment type B, D, E and provided consistency checks against the beam asymmetries shown in this paper to previous CLAS results. I also assisted in the construction of the azimuthal dependence of the event-by-event background subtraction method used.

23. S. Lombardo et al., Photoproduction of  $K^+K^-$  meson pairs on the proton, Physical Review D **98** (2018) (5)

Annotation: Comment type B and D.

24. A. Anisovich, V. Burkert, M. Dugger, E. Klempt, V. Nikonov, B. Ritchie, A. Sarantsev and U. Thoma, *Proton-η' interactions at threshold*, Physics Letters B **785** (2018), pp. 626–630,

URL: https://doi.org/10.1016%2Fj.physletb.2018.06.034

Annotation: This is a joint paper between the ASU experimental group and the Bonn-Gatchina theoretical group regarding interactions related to  $\eta'$  photoproduction from the proton near threshold.

25. J. T. Goetz et al.,  $\Xi^*$  photoproduction from threshold to W = 3.3 GeV, Physical Review C 98 (2018) (6)

Annotation: Comment type B and D.

26. M. Dugger, B. Ritchie, N. Sparks, K. Moriya, R. Tucker, R. Lee, B. Thorpe, T. Hodges, F. Barbosa, N. Sandoval and R. Jones, *Design and construction of a high-energy photon polarimeter*, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 867 (2017), pp. 115–127

Annotation: I was the lead author on this paper. I led in all aspects of this publication.

27. P. T. Mattione et al., Differential cross section measurements for  $\gamma n \to \pi^- p$  above the first nucleon resonance region, Physical Review C **96** (2017) (3)

Annotation: Comment type B, D and I was on the collaboration paper-review committee.

28. A. Anisovich et al., Differential cross sections and polarization observables from CLAS K\* photoproduction and the search for new N\* states, Physics Letters B **771** (2017), pp. 142–150

Annotation: Comment type B and D.

29. H. A. Ghoul et al., Measurement of the beam asymmetry  $\Sigma$  for  $\pi^0$  and  $\eta$  photoproduction on the proton at  $E_{\gamma} = 9$  GeV, Physical Review C **95** (2017) (4)

Annotation: This is the first physics paper from the GlueX collaboration and the first time that my determination of the photon-beam polarization from the triplet polarimeter was utilized in a published beam asymmetry. I also served on the GlueX analysis and paper review committee.

30. Z. Akbar et al., Measurement of the helicity asymmetry E in  $\omega \to \pi^+\pi^-\pi^0$  photoproduction, Physical Review C **96** (2017) (6)

Annotation: Comment type B, D and E.

31. A. Anisovich, V. Burkert, P. Collins, M. Dugger, E. Klempt, V. Nikonov, B. Ritchie, A. Sarantsev and U. Thoma,  $N^* \to N\eta'$  decays from photoproduction of  $\eta'$ -mesons off protons, Physics Letters B **772** (2017), pp. 247–252

Annotation: This is a joint paper between the ASU experimental group and the Bonn-Gatchina theoretical group regarding the excited nucleon spectrum as it relates to  $\eta'$  photoproduction.

32. P. Collins et al., Photon beam asymmetry  $\Sigma$  for  $\eta$  and  $\eta'$  photoproduction from the proton, Physics Letters B **771** (2017), pp. 213–221

Annotation: Comment type B, D, F, G and I worked very closely with the lead author and fellow ASU team member Patrick Collins. I was active in most aspects of this paper. In particular, I assisted P. Collins in his use of a Fourier analysis technique I developed for the extraction of beam asymmetries.

33. P. Collins et al., Photon beam asymmetry  $\Sigma$  in the reaction  $\gamma p \to p\omega$  for  $E_{\gamma} = 1.152$  to 1.876 GeV, Physics Letters B 773 (2017), pp. 112–120

Annotation: Comment type B, D, F, G and I worked very closely with the lead author and fellow ASU team member Patrick Collins. I was active in most aspects of this paper. In particular, I assisted P. Collins in his use of a Fourier analysis technique I developed for the extraction of beam asymmetries.

- 34. I. Senderovich et al., First measurement of the helicity asymmetry E in  $\eta$  photoproduction on the proton, Physics Letters B **755** (2016), pp. 64–69
- 35. C. A. Paterson et al., Photoproduction of  $\Lambda$  and  $\Sigma^0$  hyperons using linearly polarized photons, Physical Review C **93** (2016) (6)
- 36. R. Dickson et al., Photoproduction of the  $f_1(1285)$  meson, Physical Review C 93 (2016) (6)
- 37. B. Dey et al., "Data analysis techniques, differential cross sections, and spin density matrix elements for the reaction  $\gamma p \to \phi p$ ", Physical Review C 89 (2014) (5)
- 38. B. Dey et al., "Publisher's Note: Data analysis techniques, differential cross sections, and spin density matrix elements for the reaction  $\gamma p \to \phi p$ ", Physical Review C **90** (2014) (1)
- 39. O. Hen et al., Momentum sharing in imbalanced Fermi systems, Science **346** (2014) (6209), pp. 614–617
- 40. K. Moriya et al., Spin and parity measurement of the  $\Lambda(1405)$  baryon, Physical Review Letters 112 (2014) (8)
- 41. H. Seraydaryan et al., φ-meson photoproduction on hydrogen in the neutral decay mode, Physical Review C 89 (2014) (5)
- 42. K. Moriya et al., Publisher's Note: Differential photoproduction cross sections of the  $\Sigma^0(1385)$ ,  $\Lambda(1405)$ , and  $\Lambda(1520)$  (vol 88, 045201 (2013), Physical Review C 88 (2013) (4)
- 43. K. Moriya et al., Differential photoproduction cross sections of the  $\Sigma^0(1385)$ ,  $\Lambda(1405)$ , and  $\Lambda(1520)$ , Physical Review C 88 (2013) (4)
- 44. M. Anghinolfi et al., Comment on "Observation of a narrow structure in  ${}^{1}H(\gamma, K_{S}^{0})X$  via interference with  $\phi$ -meson production", Physical Review C **86** (2012) (6)
- 45. M. E. McCracken et al., Differential cross section and recoil polarization measurements for the reaction  $\gamma p \to K^+ \Sigma^0$  using CLAS at Jefferson Lab, Physical Review C 81 (2010) (2)
- 46. S. A. Pereira et al., Differential cross section of  $\gamma n \to K^+\Sigma^-$  on bound neutrons with incident photons from 1.1 to 3.6 GeV, Physics Letters B **688** (2010) (4-5), pp. 289–293
- 47. Y. Ilieva et al., Evidence for a backward peak in the gammad  $\rightarrow pi^0d$  cross section near the  $\eta$  threshold, The European Physical Journal A 43 (2010) (3), pp. 261–267
- 48. B. Dey et al., Differential cross sections and recoil polarizations for the reaction  $\gamma p \rightarrow K^+ \Lambda$  reaction using CLAS at Jefferson Lab, Physical Review C 82 (2010) (2)
- 49. M. Williams et al., Differential cross sections and spin density matrix elements for the reaction  $\gamma p \to p\omega$ , Physical Review C 80 (2009) (6)

- 50. M. Williams, et al., Differential cross sections for the reactions  $\gamma p \to p \eta$  and  $\gamma p \to p \eta'$ , Physical Review C 80 (2009) (4)
- 51. G. V. Fedotov, et al., Electroproduction of  $p\pi^+\pi^-$  off protons at  $0.2 < Q^2 < 0.6 GeV^2$  and 1.3 < W < 1.57 GeV with the CLAS detector, Physical Review C **79** (2009) (1)
- 52. M. Osipenko et al., Measurement of semi-inclusive  $\pi^+$  electroproduction off the proton, Physical Review D 80 (2009) (3)
- 53. Y. Prok et al., Moments of the spin structure functions  $g_1^p$  and  $g_1^d$  for  $0.05 < Q^2 < 3.0$   $GeV^2$ , Physics Letters B **672** (2009) (1), pp. 12–16
- 54. M. Williams et al., Partial wave analysis of the reaction  $\gamma p \to p\omega$  and the search for nucleon resonances, Physical Review C 80 (2009) (6)
- 55. M. Nozar et al., Search for the Photoexcitation of Exotic Mesons in the System, Physical Review Letters 102 (2009) (10)
- 56. S. A. Morrow et al., Exclusive  $\rho^0$  electroproduction on the proton at CLAS, The European Physical Journal A **39** (2008) (1), pp. 5–31
- 57. D. G. Ireland, et al., Bayesian Analysis of Pentaquark Signals from CLAS Data, Physical Review Letters 100 (2008) (5)
- 58. K. Park, et al., Cross sections and beam asymmetries for  $\vec{e}p \to en\pi^+$  in the nucleon resonance region for  $1.7 \le Q^2 \le GeV^2$ , Physical Review C 77 (2008) (1)
- 59. J. P. Santoro, et al., Electroproduction of  $\phi(1020)$  mesons at  $1.4 \leq Q^2 \leq 3.8~GeV^2$  measured with the CLAS spectrometer, Physical Review C **78** (2008) (2)
- 60. A. S. Biselli, et al., First measurement of target and double spin asymmetries for  $ep \rightarrow ep\pi^0$  in the nucleon resonance region above the  $\Delta(1232)$ , Physical Review C **78** (2008) (4)
- 61. M. H. Wood, et al., Light vector mesons in the nuclear medium, Physical Review C 78 (2008) (1)
- 62. P. E. Bosted, et al., Ratios of  $^{15}N/^{12}C$  and  $^{4}He/^{12}C$  inclusive electroproduction cross sections in the nucleon resonance region, Physical Review C **78** (2008) (1)
- 63. L. Guo et al., Cascade production in the reactions  $\gamma p \to K^+K^+(X)$  and  $\gamma p \to K^+K^+\pi^-(X)$ , Physical Review C **76** (2007) (2)
- 64. I. Hleiqawi et al., Cross sections for the  $\gamma p \to K^{*0}\Sigma^+$  reaction at  $E_{\gamma} = 1.7 3.0$  GeV, Physical Review C **75** (2007) (4)
- 65. K. S. Egiyan et al., Experimental Study of Exclusive  ${}^2H(e,e')n$  Reaction Mechanisms at High  $Q^2$ , Physical Review Letters **98** (2007) (26)

- 66. R. K. Bradford et al., First measurement of beam-recoil observables  $C_x$  and  $C_z$  in hyperon photoproduction, Physical Review C **75** (2007) (3)
- 67. T. Mibe et al., Measurement of coherent φ-meson photoproduction from the deuteron at low energies, Physical Review C **76** (2007) (5)
- 68. H. Denizli et al.,  $Q^2$  dependence of the  $S_{11}(1535)$  photocoupling and evidence for a P-wave resonance in  $\eta$  electroproduction, Physical Review C **76** (2007) (1)
- 69. P. E. Bosted et al., Quark-hadron duality in spin structure functions  $g_1^p$  and  $g_1^d$ , Physical Review C **75** (2007) (3)
- 70. R. Nasseripour et al., Search for Medium Modifications of the  $\rho$  Meson, Physical Review Letters **99** (2007) (26)
- 71. P. Ambrozewicz et al., Separated structure functions for the exclusive electroproduction of  $K^+\Lambda$  and  $K^+\Sigma^0$  final states, Physical Review C **75** (2007) (4)
- 72. M. Dugger et al.,  $\pi^0$  photoproduction on the proton for photon energies from 0.675 to 2.875 GeV, Physical Review C **76** (2007) (2)
- 73. R. Bradford et al., Differential cross sections for  $\gamma p \to K^+ Y$  for  $\Lambda$  and  $\Sigma^0$  hyperons, Physical Review C **73** (2006) (3)
- 74. S. Chen et al., Measurement of Deeply Virtual Compton Scattering with a Polarized-Proton Target, Physical Review Letters 97 (2006) (7)
- 75. M. Ungaro et al., Measurement of the  $N \to \Delta^+(1232)$  Transition at High-Momentum Transfer by  $\pi^0$  Electroproduction, Physical Review Letters **97** (2006) (11)
- 76. M. Osipenko et al., Measurement of the deuteron structure function  $F_2$  in the resonance region and evaluation of its moments, Physical Review C **73** (2006) (4)
- 77. K. Dharmawardane et al., Measurement of the x- and  $Q^2$ -dependence of the asymmetry  $A_1$  on the nucleon, Physics Letters B **641** (2006) (1), pp. 11–17
- 78. M. Battaglieri et al., Search for  $\Theta^+(1540)$  Pentaquark in High-Statistics Measurement of  $\gamma p \to \overline{K}^0 K^+ n$  at CLAS, Physical Review Letters **96** (2006) (4)
- 79. V. Kubarovsky et al., Search for  $\Theta^{++}$  Pentaquarks in the Exclusive Reaction  $\gamma p \to K^+K^-p$ , Physical Review Letters **97** (2006) (10)
- 80. B. McKinnon et al., Search for the  $\Theta^+$  Pentaquark in the Reaction  $\gamma d \to pK^-K^+n$ , Physical Review Letters **96** (2006) (21)
- 81. S. Niccolai et al., Search for the  $\Theta^+$  Pentaquark in the  $\gamma d \to \Lambda n K^+$  Reaction Measured with the CLAS Spectrometer, Physical Review Letters 97 (2006) (3)
- 82. R. D. Vita et al., Search for the  $\Theta^+$  Pentaquark in the Reactions  $\gamma p \to \overline{K}^0 K^+ n$  and  $\gamma p \to \overline{K}^0 K^0 p$ , Physical Review D **74** (2006) (3)

- 83. M. Dugger et al., Erratum: η Photoproduction on the Proton for Photon Energies from 1.527 to 2.227 GeV [Phys. Rev. Lett 96, 062001 (2006)], Physical Review Letters 96 (2006) (16)
- 84. S. Strauch et al., Beam-Helicity Asymmetries in Double-Charged-Pion Photoproduction on the Proton, Physical Review Letters 95 (2005) (16)
- 85. L. Morand et al., Deeply virtual and exclusive electroproduction of  $\omega$ -mesons, The European Physical Journal A **24** (2005) (3), pp. 445–458
- 86. J. W. Price et al., Exclusive photoproduction of the cascade (Ξ) hyperons, Physical Review C **71** (2005) (5)
- 87. C. Hadjidakis et al., Exclusive  $\rho^0$  meson electroproduction from hydrogen at CLAS, Physics Letters B **605** (2005) (3-4), pp. 256–264
- 88. K. Joo et al., Measurement of the polarized structure function  $\sigma_{LT'}$  for pion electroproduction in the Roper-resonance region, Physical Review C **72** (2005) (5)
- 89. S. Taylor et al., Radiative decays of the  $\Sigma^0(1385)$  and  $\Lambda$  hyperons, Physical Review C **71** (2005) (5)
- 90. S. Taylor et al., Erratum: Radiative decays of the  $\Sigma^0(1385)$  and  $\Lambda$  hyperons, 054609 (2005)], Physical Review C **72** (2005) (3)
- 91. D. Protopopescu et al., Survey of  $A_{LT'}$  asymmetries in semi-exclusive electron scattering on  $^4He$  and  $^12C$ , Nuclear Physics A **748** (2005) (3-4), pp. 357–373
- 92. M. Mirazita et al., Complete angular distribution measurements of two-body deuteron photodisintegration between 0.5 and 3GeV, Physical Review C 70 (2004) (1)
- 93. S. Niccolai et al., Complete measurement of three-body photodisintegration of <sup>3</sup>He for photon energies between 0.35 and 1.55 GeV, Physical Review C **70** (2004) (6)
- 94. J. W. C. McNabb et al., Hyperon photoproduction in the nucleon resonance region, Physical Review C **69** (2004) (4)
- 95. H. Avakian et al., Measurement of beam-spin asymmetries for  $\pi^+$  electroproduction above the baryon resonance region, Physical Review D **69** (2004) (11)
- 96. K. Joo et al., Measurement of the polarized structure function  $\sigma_{LT'}$  for  $p\vec{e}\pi^+n$  in the  $\Delta(1232)$  resonance region, Physical Review C **70** (2004) (4)
- 97. V. Kubarovsky et al., Publisher's Note: Observation of an Exotic Baryon with S=+1 in photoproduction from the proton, (vol 92, art. no. 032001 (2004)], Physical Review Letters **92** (2004) (4)
- 98. A. V. Stavinsky et al., Proton Source Size Measurements in the  $eA \rightarrow e'ppX$  Reaction, Physical Review Letters **93** (2004) (19)

- 99. K. McCormick et al., Tensor polarization of  $\phi$  meson photoproduced at high t, Physical Review C **69** (2004) (3)
- 100. R. A. Niyazov et al., Publisher's Note: Two-Nucleon Momentum Distributions Measured in  ${}^{3}He(e,e'pp)n$  [Phys. Rev. Lett. PRLTA00031-9007 **92**, 052303 (2004)], Physical Review Letters **92** (2004) (9)
- 101. R. A. Niyazov et al., Two-Nucleon Momentum Distributions Measured in  ${}^{3}He(e,e'pp)n$ , Physical Review Letters **92** (2004) (5)
- 102. D. S. Carman et al., First Measurement of Transferred Polarization in the Exclusive  $\vec{e}p \rightarrow e'K^+\vec{\Lambda}$  Reaction, Physical Review Letters **90** (2003) (13)
- 103. M. Osipenko et al., Kinematically complete measurement of the proton structure function  $F_2$  in the resonance region and evaluation of its moments, Physical Review D 67 (2003) (9)
- 104. M. Ripani et al., Measurement of  $ep \to e'p\pi^+\pi^-$  and Baryon Resonance Analysis, Physical Review Letters **91** (2003) (2)
- 105. J. Yun et al., Measurement of inclusive spin structure functions of the deuteron, Physical Review C 67 (2003) (5)
- 106. K. Joo et al., Measurement of the polarized structure function  $\sigma_{LT'}$  for  $p(e, e'p)\pi^0$  in the  $\Delta(1232)$  resonance region, Physical Review C **68** (2003) (3)
- 107. S. Stepanyan et al., Observation of an Exotic S = +1 Baryon in Exclusive Photoproduction from the Deuteron, Physical Review Letters  $\mathbf{91}$  (2003) (25)
- 108. M. Battaglieri et al., Photoproduction of the  $\omega$  Meson on the Proton at Large Momentum Transfer, Physical Review Letters **90** (2003) (2)
- 109. B. Mecking et al., The CEBAF large acceptance spectrometer (CLAS), Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 503 (2003) (3), pp. 513–553
- 110. A. Biselli et al.,  $ep \to ep\pi^0$  reaction studied in the  $\Delta(1232)$  mass region using polarization asymmetries, Physical Review C **68** (2003) (3)
- 111. R. D. Vita et al., First Measurement of the Double Spin Asymmetry in  $(e)\vec{p} \to e'\pi^+\pi^- n$  in the Resonance Region, Physical Review Letters 88 (2002) (8)
- 112. R. D. Vita et al., Erratum: First Measurement of the Double Spin Asymmetry in  $(e)\vec{p} \rightarrow e'\pi^+\pi^- n$  in the Resonance Region [Phys. Rev. Lett. 88, 082001 (2002)], Physical Review Letters 88 (2002) (18)
- 113. K. Joo et al.,  $Q^2$  dependence of quadrupole strength in the  $\gamma^*p \to \Delta^+(1232) \to p\pi^0$ Transition, Physical Review Letters 88 (2002) (12)

- 114. M. Dugger et al., Publisher's Note: η Photoproduction on the Proton for Photon Energies from 0.75 to 1.95 GeV, [Phys. Rev. Lett. 89 222002 (2002)], Physical Review Letters 89 (2002) (24)
- 115. M. Dugger et al., η Photoproduction on the Proton for Photon Energies from 0.75 to 1.95 GeV, Physical Review Letters 89 (2002) (22)
- 116. S. P. Barrow et al., Electroproduction of the  $\Lambda(1520)$  hyperon, Physical Review C **64** (2001) (4)
- 117. M. Battaglieri et al., Photoproduction of the  $\rho^0$  Meson on the Proton at Large Momentum Transfer, Physical Review Letters 87 (2001) (17)
- 118. R. Thompson et al., The ep  $\rightarrow$  e'p $\eta$  reaction at and above the  $S_{11}(1535)$  Baryon Resonance, Physical Review Letters 86 (2001) (9), pp. 1702–1706
- 119. E. Anciant et al., Photoproduction of  $\phi(1020)$  Mesons on the Proton at Large Momentum Transfer, Physical Review Letters 85 (2000) (22), pp. 4682–4686
- 120. D. Sober et al., The bremsstrahlung tagged photon beam in Hall B at JLab, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 440 (2000) (2), pp. 263–284
- 121. F. Boehm *et al.*, The Palo Verde reactor neutrino experiment a test for long baseline neutrino oscillations, Nuclear Physics B Proceedings Supplements **70** (1999) (1-3), pp. 191–194
- 122. F. Boehm *et al.*, The Palo Verde reactor neutrino oscillation experiment, Nuclear Physics B Proceedings Supplements **77** (1999) (1-3), pp. 166–170
- 123. F. Boehm et al., The Palo Verde reactor neutrino experiment A test for long baseline neutrino oscillations, Progress in Particle and Nuclear Physics 40 (1998), pp. 253–262