Curriculum Vitae
David H. Potterveld

Engineering Physicist, Physics Division, Argonne National Laboratory
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Degrees:

1989 Ph.D., Physics, California Institute of Technology
1981 B.S., Physics, Harvey Mudd College

Experience:

2000-2005 Engineering Physicist, Argonne National Laboratory
1997-1999 Scientific Associate, Argonne National Laboratory
1991-1997 Assistant Physicist, Argonne National Laboratory
1988-1991 Postdoctoral Appointee, Argonne National Laboratory
1981-1988 Graduate Research Assistant, California Institute of Technology

Professional Memberships:

1986-2005 American Physical Society

Research Overview:

My research activities have been focused into several broad areas. Most recently, I've been working in the area of fundamental tests of the Standard Model. This has taken the form of a search for a static electric dipole moment in ^{225}Ra using optical traps, and a neutrino scattering/oscillation experiment at Fermilab. These are new experiments in which I played a role in the (ongoing) design and operation.

A second, and much longer effort has involved the study of the partonic structure of nucleons, and more broadly the dynamics and behavior of nucleons and other strongly interacting particles inside the nuclear medium. This effort began with my Ph.D. experiment at SLAC, and has involved all phases of planning, conducting, analyzing, and reporting results from many experiments at facilities in the USA, Europe, and Russia. A highlight of this effort has been the study of the spin structure of the proton and neutron using polarized beams and polarized targets developed by my group.

Much of this research was conducted at (what were then) new facilities at Jefferson Laboratory in Virginia, and the DESY laboratory in Germany. I had key roles in the design and construction of major equipment for these labs: the Short-Orbit Spectrometer at JLAB, and the HERMES Ring Imaging Cerenkov detector at DESY. As a result, I am a leading expert in the design and optimization of high-order magnetic spectrometers. My most recent effort in this direction is the design of a proposed Super-High Momentum Spectrometer, a major component of the energy upgrade JLAB is seeking.

Part of my work has involved writing Monte-Carlo simulation, high-speed data acquisition, and data analysis codes for complicated physical processes and terabyte-scale data sets. This has led to an interest in high-performance computing and has resulting in my managing our groups computing facilities for many years.

Refereed Publications: (Publication metric = 37 papers with $\geq$ 37 citations)

1. *"Cross section measurements of charged pion photoproduction in hydrogen and deuterium from 1.1-GeV to 5.5-GeV,"*
   L. Y. Zhu *et al.* ,Phys. Rev. C **71**, 044603 (2005)

2. *"Quark helicity distributions in the nucleon for up, down, and strange quarks from semi-inclusive deep-inelastic scattering,"*
   A. Airapetian *et al.* ,Phys. Rev. D **71**, 012003 (2005)

3. *"Search for an exotic S = -2, Q = -2 baryon resonance at a mass near 1862-MeV in quasi-real photoproduction,"*
   A. Airapetian *et al.* ,Phys. Rev. D **71**, 032004 (2005)

4. *"Single-spin asymmetries in semi-inclusive deep-inelastic scattering on a transversely polarized hydrogen target,"*
   A. Airapetian *et al.* ,Phys. Rev. Lett. **94**, 012002 (2005)

5. *"Subleading-twist effects in single-spin asymmetries in semi-inclusive deep-inelastic scattering on a longitudinally polarized hydrogen target,"*
   A. Airapetian *et al.* ,Phys. Lett. B **622**, 14 (2005)

6. *"The HERMES polarized hydrogen and deuterium gas target in the HERA electron storage ring,"*
   A. Airapetian *et al.* ,Nucl. Instrum. Meth. A **540**, 68 (2005)

7. *"Angular distributions for (Lambda)H-3,4 bound states in the He-3,4(e,e' K+) reaction,"*
   F. Dohrmann *et al.* ,Phys. Rev. Lett. **93**, 242501 (2004)

8. *"Evidence for a narrow |S| = 1 baryon state at a mass of 1528-MeV in quasi-real photoproduction,"*
   A. Airapetian *et al.* ,Phys. Lett. B **585**, 213 (2004)

9. *"Flavor decomposition of the sea quark helicity distributions in the nucleon from semi-inclusive deep-inelastic scattering,"*
   A. Airapetian *et al.* ,Phys. Rev. Lett. **92**, 012005 (2004)

10. *"Hard exclusive electroproduction of pi+ pi- pairs,"*
    A. Airapetian *et al.* ,Phys. Lett. B **599**, 212 (2004)

11. *"Measurements of electron proton elastic cross sections for 0.4-(GeV/c)**2 ¡ Q**2 ¡ 5.5-(GeV/c)**2,"*
    M. E. Christy *et al.* ,Phys. Rev. C **70**, 015206 (2004)

12. *"Near threshold electroproduction of the omega meson at Q**2 approx. 0.5-GeV**2,"*
P. Ambrozewicz *et al.* ,Phys. Rev. C **70**, 035203 (2004)

13. *"A study of the quasi-elastic (e,e' p) reaction on C-12, Fe-56 and Au-97,"*
D. Dutta *et al.* ,Phys. Rev. C **68**, 064603 (2003)

14. *"Cross section measurement of charged pion photoproduction from hydrogen and deuterium,"*
L. Y. Zhu *et al.* ,Phys. Rev. Lett. **91**, 022003 (2003)

15. *"Double-spin asymmetries in the cross section of rho0 and Phi production at intermediate energies,"*
A. Airapetian *et al.* ,Eur. Phys. J. C **29**, 171 (2003)

16. *"Evidence for quark-hadron duality in the proton spin asymmetry A1,"*
A. Airapetian *et al.* ,Phys. Rev. Lett. **90**, 092002 (2003)

17. *"Measurement of single-spin azimuthal asymmetries in semi-inclusive electroproduction of pions and kaons on a longitudinally polarised deuterium target,"*
A. Airapetian *et al.* ,Phys. Lett. B **562**, 182 (2003)

18. *"Measurement of the tensor analyzing powers T(20) and T(21) in elastic electron deuteron scattering,"*
D. M. Nikolenko *et al.*,Phys. Rev. Lett. **90**, 072501 (2003)

19. *"Nuclear transparency with the gamma n → pi- p process in He-4,"*
D. Dutta *et al.* ,Phys. Rev. C **68**, 021001 (2003)

20. *"Quark fragmentation to pi+-, pi0, K+-, p and anti-p in the nuclear environment,"*
A. Airapetian *et al.* ,Phys. Lett. B **577**, 37 (2003)

21. *"Separation of the longitudinal and transverse cross sections in the p(e,e' K+)Lambda and p(e,e' K+)Sigma0 reactions,"*
R. M. Mohring *et al.* ,Phys. Rev. C **67**, 055205 (2003)

22. *"The Q**2-dependence of nuclear transparency for exclusive rho0 production,"*
A. Airapetian *et al.* ,Phys. Rev. Lett. **90**, 052501 (2003)

23. *"The Q**2-dependence of the generalised Gerasimov-Drell-Hearn integral for the deuteron, proton and neutron,"*
A. Airapetian *et al.* ,Eur. Phys. J. C **26**, 527 (2003)

24. *"Measurement of longitudinal and transverse cross sections in the He-3(e,e-prime pi +)3H reaction at W=1.6 GeV,"*
D. Gaskell *et al.*,Phys. Rev. C **65**, 011001 (2002)

25. *"Nuclear transparency from quasielastic A(e,e'p) reactions up to Q**2 = 8.1-(GeV/c)**2,"*
K. Garrow *et al.*,Phys. Rev. C **66**, 044613 (2002)

26. *"Single-spin azimuthal asymmetry in exclusive electroproduction of pi+ mesons,"*
A. Airapetian *et al.* ,Phys. Lett. B **535**, 85 (2002)

27. *"The HERMES dual-radiator ring imaging Cerenkov detector,"*
N. Akopov *et al.*,Nucl. Instrum. Meth. A **479**, 511 (2002)

28. *"Double spin asymmetry in the cross section for exclusive rho0 production in lepton proton scattering,"*
A. Airapetian *et al.* ,Phys. Lett. B **513**, 301 (2001)

29. *"Electroproduction of kaons and light hypernuclei,"*
J. Reinhold *et al.*,Nucl. Phys. A **684**, 470 (2001)

30. *"Electroproduction of kaons on light nuclei,"*
B. Zeidman *et al.*,Nucl. Phys. A **691**, 37 (2001)

31. *"Hadron formation in deep-inelastic positron scattering in a nuclear environment,"*
A. Airapetian *et al.* ,Eur. Phys. J. C **20**, 479 (2001)

32. *"Longitudinal electroproduction of charged pions from H-1, H-2, He-3,"*
D. Gaskell *et al.*,Phys. Rev. Lett. **87**, 202301 (2001)

33. *"Measurement of longitudinal spin transfer to Lambda hyperons in deep-inelastic lepton scattering,"*
A. Airapetian *et al.* ,Phys. Rev. D **64**, 112005 (2001)

34. *"Measurement of polarization observables in elastic and inelastic electron deuteron scattering at the VEPP-3 storage ring,"*
D. M. Nikolenko *et al.*,Nucl. Phys. A **684**, 525 (2001)

35. *"Measurement of the beam spin azimuthal asymmetry associated with deeply-virtual Compton scattering,"*
A. Airapetian *et al.* ,Phys. Rev. Lett. **87**, 182001 (2001)

36. *"Measurement of the high energy two-body deuteron photodisintegration differential cross-section,"*
E. C. Schulte *et al.*,Phys. Rev. Lett. **87**, 102302 (2001)

37. *"Multiplicity of charged and neutral pions in deep-inelastic scattering of 27.5-GeV positrons on hydrogen,"*
A. Airapetian *et al.* ,Eur. Phys. J. C **21**, 599 (2001)

38. *"New results for the charged pion electromagnetic form-factor,"*
J. Volmer *et al.* ,Phys. Rev. Lett. **86**, 1713 (2001)

39. *"Single-spin azimuthal asymmetries in electroproduction of neutral pions in semi-inclusive deep-inelastic scattering,"*
A. Airapetian *et al.* ,Phys. Rev. D **64**, 097101 (2001)

40. *"Evidence for valencelike quark hadron duality,"*
I. Niculescu *et al.*,Phys. Rev. Lett. **85**, 1182 (2000)

41. *"Exclusive leptoproduction of rho0 mesons from hydrogen at intermediate virtual photon energies,"*
A. Airapetian *et al.* ,Eur. Phys. J. C **17**, 389 (2000)

42. *"Experimental verification of quark hadron duality,"*
I. Niculescu *et al.*,Phys. Rev. Lett. **85**, 1186 (2000)

43. *"Lambda and Antilambda polarization from deep inelastic muon scattering,"*
M. R. Adams *et al.* ,Eur. Phys. J. C **17**, 263 (2000)

44. *"Measurement of angular distributions and R = sigma(L)/sigma(T) in diffractive electroproduction of rho0 mesons,"*
K. Ackerstaff *et al.* ,Eur. Phys. J. C **18**, 303 (2000)

45. *"Measurement of the spin asymmetry in the photoproduction of pairs of high p(T) hadrons at HERMES,"*
A. Airapetian *et al.* ,Phys. Rev. Lett. **84**, 2584 (2000)

46. *"Nuclear effects on R = sigma(L)/sigma(T) in deep inelastic scattering,"*
K. Ackerstaff *et al.* ,Phys. Lett. B **475**, 386 (2000); Erratum-ibid. B **567**, 339 (2003)

47. *"Observation of a single-spin azimuthal asymmetry in semi-inclusive pion electro-production,"*
A. Airapetian *et al.* ,Phys. Rev. Lett. **84**, 4047 (2000)

48. *"Optical characterization of n = 1.03 silica aerogel used as radiator in the RICH of HERMES,"*
E. Aschenauer *et al.*,Nucl. Instrum. Meth. A **440**, 338 (2000)

49. *"Separated spectral functions for the quasifree C-12 (e, e-prime p) reaction,"*
D. Dutta *et al.*,Phys. Rev. C **61**, 061602 (2000)

50. *"The Q**2-dependence of the generalised Gerasimov-Drell-Hearn integral for the proton,"*
A. Airapetian *et al.* ,Phys. Lett. B **494**, 1 (2000)

51. *"Beam-induced nuclear depolarization in a gaseous polarised hydrogen target,"*
K. Ackerstaff *et al.* ,Phys. Rev. Lett. **82**, 1164 (1999)

52. *"Coherent pi-0 photoproduction on the deuteron up to 4-GeV,"*
D. G. Meekins *et al.*,Phys. Rev. C **60**, 052201 (1999)

53. *"Flavor decomposition of the polarized quark distributions in the nucleon from inclusive and semi-inclusive deep-inelastic scattering,"*
K. Ackerstaff *et al.* ,Phys. Lett. B **464**, 123 (1999)

54. *"Observation of a coherence length effect in exclusive rho0 electroproduction,"*
K. Ackerstaff *et al.* ,Phys. Rev. Lett. **82**, 3025 (1999)

55. *"Associated Lambda production at Jefferson Lab,"*
O. K. Baker *et al.* ,Nucl. Phys. A **639**, 189 (1998)

56. *"Determination of the deep inelastic contribution to the generalised Gerasimov-Drell-Hearn integral for the proton and neutron,"*
K. Ackerstaff *et al.* ,Phys. Lett. B **444**, 531 (1998)

57. *"HERMES spectrometer,"*
K. Ackerstaff *et al.* ,Nucl. Instrum. Meth. A **417**, 230 (1998)

58. *"Kaon electroproduction on deuterium,"*
D. Abbott *et al.* ,Nucl. Phys. A **639**, 197 (1998)

59. *"Longitudinal and transverse cross sections in the H-1(e,e' K+)Lambda reaction,"*
G. Niculescu *et al.*,Phys. Rev. Lett. **81**, 1805 (1998)

60. *"Measurement of the proton spin structure function g1(p) with a pure hydrogen target,"*
A. Airapetian *et al.* ,Phys. Lett. B **442**, 484 (1998)

61. *"Measurements of deuteron photodisintegration up to 4.0-GeV,"*
C. Bochna *et al.* ,Phys. Rev. Lett. **81**, 4576 (1998)

62. *"Quasifree (e, e-prime p) reactions and proton propagation in nuclei,"*
D. Abbott *et al.*,Phys. Rev. Lett. **80**, 5072 (1998)

63. *"The flavor asymmetry of the light quark sea from semi-inclusive deep inelastic scattering,"*
K. Ackerstaff *et al.* ,Phys. Rev. Lett. **81**, 5519 (1998)

64. *"Diffractive production of rho(770)0 mesons in muon proton interactions at 470-GeV,"*
M. R. Adams *et al.* ,Z. Phys. C **74**, 237 (1997)

65. *"Inclusive single-particle distributions and transverse momenta of forward produced charged hadrons in mu p scattering at 470-GeV,"*
M. R. Adams *et al.* ,Z. Phys. C **76**, 441 (1997)

66. *"Measurement of the neutron spin structure function g1(n) with a polarized He-3 internal target,"*
K. Ackerstaff *et al.* ,Phys. Lett. B **404**, 383 (1997)

67. *"Inclusive electron scattering from nuclei at x approximately = 1,"*
J. Arrington *et al.*,Phys. Rev. C **53**, 2248 (1996)

68. *"Proton and deuteron structure functions in muon scattering at 470-GeV,"*
M. R. Adams *et al.* ,Phys. Rev. D **54**, 3006 (1996)

69. *"A-dependence of nuclear transparency in quasielastic A (e, e-prime p) at high Q**2,"*
T. G. O'Neill *et al.*,Phys. Lett. B **351**, 87 (1995)

70. *"Evidence for virtual Compton scattering from the proton,"*
J. F. J. van den Brand *et al.*,Phys. Rev. D **52**, 4868 (1995)

71. *"Exclusive electron scattering from deuterium at high momentum transfer,"*
H. J. Bulten *et al.*,Phys. Rev. Lett. **74**, 4775 (1995)

72. *"Extraction of the ratio F2(n) / F2(p) from muon - deuteron and muon - proton scattering at small x and Q**2,"*
M. R. Adams *et al.* ,Phys. Rev. Lett. **75**, 1466 (1995)

73. *"Measurement of nuclear transparencies from exclusive rho0 meson production in muon - nucleus scattering at 470-GeV,"*
M. R. Adams *et al.* ,Phys. Rev. Lett. **74**, 1525 (1995)

74. *"Nuclear decay following deep inelastic scattering of 470-GeV muons,"*
M. R. Adams *et al.* ,Phys. Rev. Lett. **74**, 5198 (1995); Erratum-ibid. **80**, 2020 (1998)

75. *"Shadowing in inelastic scattering of muons on carbon, calcium and lead at low x(Bj),"*
M. R. Adams *et al.* ,Z. Phys. C **67**, 403 (1995)

76. *"Two body photodisintegration of the deuteron up to 2.8-GeV,"*
J. E. Belz *et al.*,Phys. Rev. Lett. **74**, 646 (1995)

77. *"An Active storage cell for a polarized gas internal target,"*
K. P. Coulter *et al.*,Nucl. Instrum. Meth. A **350**, 423 (1994)

78. *"Measurement of kinematic and nuclear dependence of R = sigma-L / sigma-t in deep inelastic electron scattering,"*
S. Dasu *et al.*,Phys. Rev. D **49**, 5641 (1994)

79. *"Measurements of the proton elastic form-factors for 1-GeV/c**2 ¡= Q**2 ¡= 3-GeV/C**2 at SLAC,"*
R. C. Walker *et al.*,Phys. Rev. D **49**, 5671 (1994)

80. *"Momentum transfer dependence of nuclear transparency from the quasielastic C-12 (e, e-prime p) reaction,"*
N. Makins *et al.*,Phys. Rev. Lett. **72**, 1986 (1994)

81. *"A Polarized gas internal target using a storage cell in an electron storage ring,"*
R. Gilman *et al.*,Nucl. Instrum. Meth. A **327**, 277 (1993)

82. *"Inclusive electron nucleus scattering at high momentum transfer,"*
D. B. Day *et al.*,Phys. Rev. C **48**, 1849 (1993)

83. *"Two-body disintegration of the deuteron with 0.8-GeV to 1.8-GeV photons,"*
S. J. Freedman *et al.*,Phys. Rev. C **48**, 1864 (1993)

84. *"High momentum transfer R(T,L) inclusive response functions for He-3, He-4 SLAC-NE-9 experiment,"*
Z. E. Meziani *et al.*,Phys. Rev. Lett. **69**, 41 (1992)

85. *"Nuclear structure functions at x ¿ 1,"*
B. W. Filippone *et al.*,Phys. Rev. C **45**, 1582 (1992)

86. *"Longitudinal And Transverse Response Functions In Fe-56(E, E-Prime) At Momentum Transfer Near 1-Gev/C,"*
J. P. Chen *et al.*,Phys. Rev. Lett. **66**, 1283 (1991)

87. *"A Combined Analysis Of Slac Experiments On Deep Inelastic E P And E D Scattering,"*
L. W. Whitlow *et al.*,Nucl. Phys. Proc. Suppl. **16**, 215 (1990)

88. *"High-Energy Deuteron Photodisintegration,"*
J. Napolitano *et al.* ,Nucl. Phys. A **508**, 455 (1990)

89. *"Measurement Of Tensor Analyzing Power In Electron Deuteron Elastic Scattering,"*
R. Gilman *et al.*,Phys. Rev. Lett. **65**, 1733 (1990)

90. *"Measurement Of The Proton Elastic Form-Factors For Q**2 = 1-Gev/C**2 - 3-Gev/C**2,"*
R. C. Walker *et al.*,Phys. Lett. B **224**, 353 (1989); Erratum-ibid. B **240**, 522 (1990)

91. *"Nuclear Matter Response Function,"*
D. B. Day *et al.*,Phys. Rev. C **40**, 1011 (1989)

92. *"Precision Measurement Of R = Sigma(L) / Sigma(T) F(2) In Deep Inelastic Electron Scattering,"*
A. Bodek *et al.*,Nucl. Phys. Proc. Suppl. **7B**, 141 (1989)

93. *"Delta Electroproduction And Inelastic Charge Scattering From Carbon And Iron,"*
D. T. Baran *et al.*,Phys. Rev. Lett. **61**, 400 (1988)

94. *"Measurement Of The Difference In R = Sigma-L / Sigma-T And Sigma(A) / Sigma(D) In Deep Inelastic E D, E Fe And E Au Scattering,"*
S. Dasu *et al.*,Phys. Rev. Lett. **60**, 2591 (1988)

95. *"Measurement Of The Differential Cross-Section For The Reaction H-2 (Gamma, P) N At High Photon Energies And Theta (C.M.) = 90-Degrees,"*
J. Napolitano *et al.*,Phys. Rev. Lett. **61**, 2530 (1988)

96. *"Precision Measurement Of R = Sigma-L / Sigma-T And F(2) In Deep Inelastic Electron Scattering,"*
S. Dasu *et al.*,Phys. Rev. Lett. **61**, 1061 (1988)

97. *"Y Scaling In Electron Nucleus Scattering,"*
D. B. Day *et al.*,Phys. Rev. Lett. **59**, 427 (1987)

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