

## CURRICULUM VITAE

### Personal Data

Name: Edward Rufus Kinney  
Date of Birth: 21 January 1959  
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### Addresses

Living: 1929 Kearney Street  
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### Education

1981 S.B., Physics, Massachusetts Institute of Technology.  
Thesis: *A Comparison of Photodeuteron Cross Sections for  ${}^6\text{Li}$  and  ${}^7\text{Li}$  at  $E_\gamma = 100, 150 \text{ MeV}$*   
1988 Ph.D., Physics, Massachusetts Institute of Technology.  
Thesis: *Inclusive Pion Double Charge Exchange in  ${}^4\text{He}$  at Intermediate Energies*

### Positions

1981–1988 Graduate Research Assistant, MIT.  
1986 Recitation Instructor, MIT.  
1988–1991 Postdoctoral Appointee, Argonne National Laboratory.  
1991–1998 Assistant Professor of Physics, University of Colorado, Boulder.  
1997–1999 Spokesman, HERMES Experiment, Deutsches Elektronen Synchrotron.  
1998–2004 Associate Professor of Physics, University of Colorado, Boulder.  
2000–2007 Director, Nuclear Physics Laboratory, University of Colorado, Boulder.  
2004–present Professor of Physics, University of Colorado, Boulder.  
2006 Chairman, APS Topical Group on Hadronic Physics.  
2007–2008 Spokesman, HERMES Experiment, Deutsches Elektronen Synchrotron.

## **Societies and Honors**

Phi Beta Kappa

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Fellow, American Physical Society

1988 Louis Rosen Prize for best PhD thesis based on research at LAMPF.

2005-2006 Faculty Fellowship, University of Colorado.

2014 ASSETT Award of Excellence in Teaching with Technology

## **Present Research Interests**

Experimental nuclear physics at intermediate/high energies. Study of the quark-gluon structure of the nucleon using high energy photons from electron accelerators (Jefferson Lab and DESY) and with high energy  $pp$  and  $pA$  collisions at Fermilab and RHIC. Study of quark energy loss and hadronization in nuclear environments.

## BIBLIOGRAPHY

### Publications in Refereed Journals

Full Author lists available at <http://www.slac.stanford.edu/spires/>

#### Deep Inelastic Scattering Measurements

- “Nuclear Decay Following Deep Inelastic Scattering of 470 GeV Muons,” M.R. Adams *et al.*, *Phys. Rev. Lett.* **74**, 5198 (1995).
- “Extraction of the Ratio  $F_2^n/F_2^p$  from Muon-Deuteron and Muon-Proton Scattering at Small  $x$  and  $Q^2$ ,” M.R. Adams *et al.*, *Phys. Rev. Lett.* **75**, 1466 (1995).
- “Shadowing in inelastic scattering of muons on carbon, calcium and lead at low  $x_{Bj}$ ,” M.R. Adams *et al.*, *Z. Phys.* **C67**, 403 (1995).
- “Proton and deuteron structure functions in muon scattering at 470 GeV,” M.R. Adams *et al.*, *Phys. Rev.* **D54**, 3006 (1996).
- “Measurement of the Neutron Spin Structure Function  $g_1^n$  with a Polarized  $^3\text{He}$  Internal Target,” K. Ackerstaff *et al.*, *Phys. Lett.* **B404**, 383 (1997).
- “Flavor Asymmetry of the Light Quark Sea from Semi-inclusive Deep-Inelastic Scattering,” K. Ackerstaff *et al.*, *Phys. Rev. Lett.* **81**, 5519 (1998).
- “Measurement of the proton spin structure function  $g_1^p$  with a pure hydrogen target,” A. Airapetian *et al.*, *Phys. Lett.* **B442**, 484 (1998).
- “Determination of the deep inelastic contribution to the generalised Gerasimov-Drell-Hearn integral for the proton and neutron,” K. Ackerstaff *et al.*, *Phys. Lett.* **B444**, 531 (1998).
- “Flavor decomposition of the polarized quark distributions in the nucleon from inclusive and semi-inclusive deep-inelastic scattering,” K. Ackerstaff *et al.*, *Phys. Lett.* **B464**, 123 (1999).
- “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).
- “Observation of a single-spin azimuthal asymmetry in semi-inclusive pion electroproduction,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **84**, 4047 (2000).
- “Nuclear effects on  $R = \sigma_L/\sigma_T$  in deep inelastic scattering,” K. Ackerstaff *et al.*, *Phys. Lett.* **B475**, 386 (2000); Erratum *ibid.* **B567**, 339 (2003).
- “Lambda and Antilambda polarization from deep inelastic muon scattering,” M. R. Adams *et al.*, *Eur. Phys. J.* **C17**, 263 (2000).
- “The  $Q^2$ -dependence of the generalised Gerasimov-Drell-Hearn integral for the proton,” A. Airapetian *et al.*, *Phys. Lett.* **B494**, 1 (2000).
- “Hadron formation in deep-inelastic positron scattering in a nuclear environment,” A. Airapetian *et al.*, *Eur. Phys. J.* **C20**, 479 (2001).

- “Multiplicity of charged and neutral pions in deep-inelastic scattering of 27.5 GeV positrons on hydrogen,” A. Airapetian *et al.*, *Eur. Phys. J.* **C21**, 599 (2001).
- “Single-spin azimuthal asymmetries in electroproduction of neutral pions in semi-inclusive deep-inelastic scattering,” A. Airapetian *et al.*, *Phys. Rev.* **D64**, 097101 (2001).
- “Measurement of longitudinal spin transfer to Lambda hyperons in deep-inelastic lepton scattering,” A. Airapetian *et al.*, *Phys. Rev.* **D64**, 112005 (2001).
- “Evidence for quark-hadron duality in the proton spin asymmetry  $A_1$ ,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **90**, 092002 (2003).
- “The  $Q^2$ -dependence of the generalised Gerasimov-Drell-Hearn integral for the deuteron, proton and neutron,” A. Airapetian *et al.*, *Eur. Phys. J.* **C26**, 527 (2003).
- “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.* **B562**, 182 (2003).
- “Quark fragmentation to  $\pi^\pm$ ,  $\pi^0$ ,  $K^\pm$ ,  $p$  and anti- $p$  in the nuclear environment,” A. Airapetian *et al.*, *Phys. Lett.* **B577**, 37 (2003).
- “HERMES at HERA: Quark-Gluon Spin Structure of the Nucleon,” E. Kinney, E. Steffens and D. Ryckbosch, *Nucl. Phys. News* Vol. 14, No. 1, 21 (2004).
- “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).
- “Quark helicity distributions in the nucleon for up, down, and strange quarks from semi-inclusive deep-inelastic scattering,” A. Airapetian *et al.*, *Phys. Rev.* **D71**, 012003 (2005).
- “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).
- “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.* **B622**, 14 (2005).
- “First measurement of the tensor structure function  $b_1$  of the deuteron,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **95**, 242001 (2005).
- “Double hadron lepton production in the nuclear medium,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **96**, 162301 (2006).
- “Longitudinal Spin Transfer to the  $\Lambda$  Hyperon in Semi-Inclusive Deep-Inelastic Scattering,” A. Airapetian *et al.*, *Phys. Rev.* **D74**, 072004 (2006).

- “Precise determination of the spin structure function  $g_1$  of the proton, deuteron and neutron,” A. Airapetian *et al.*, *Phys. Rev.* **D75**, 012007 (2007).
- “Longitudinal-transverse separations of structure functions at low  $Q^2$  for hydrogen and deuterium,” V. Tvaskis *et al.*, *Phys. Rev. Lett.* **98**, 142301 (2007).
- “Beam-spin asymmetries in the azimuthal distribution of pion electroproduction,” A. Airapetian *et al.*, *Phys. Lett.* **B648**, 164 (2007).
- “Transverse Polarization of  $\Lambda$  and  $\bar{\Lambda}$  Hyperons in Quasireal Photoproduction,” A. Airapetian *et al.*, *Phys. Rev.* **D76**, 092008 (2007).
- “Hadronization in semi-inclusive deep-inelastic scattering on nuclei,” A. Airapetian *et al.*, *Nucl. Phys.* **B780**, 1 (2007).
- “Evidence for a Transverse Single-Spin Asymmetry in Leptoproduction of  $\pi^+\pi^-$  Pairs,” A. Airapetian *et al.*, *JHEP* **0806**, 017 (2008).
- “Measurement of Parton Distributions of Strange Quarks in the Nucleon from Charged-Kaon Production in Deep-Inelastic Scattering on the Deuteron,” A. Airapetian *et al.*, *Phys. Lett.* **B666**, 446 (2008).
- “Neutral Pion Electroproduction in the Resonance Region at High  $Q^2$ ,” A. N. Villano *et al.*, *Phys. Rev.* **C80**, 035203 (2009)
- “Applications of quark-hadron duality in  $F_2$  structure function,” S. P. Malace *et al.*, *Phys. Rev.* **C80**, 035207 (2009).
- “Observation of the Naive-T-odd Sivers Effect in Deep-Inelastic Scattering,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **103**, 152002 (2009).
- “Search for a Two-Photon Exchange Contribution to Inclusive Deep-Inelastic Scattering,” A. Airapetian *et al.*, *Phys. Lett.* **B682**, 351 (2010).
- “Transverse momentum broadening of hadrons produced in semi-inclusive deep-inelastic scattering on nuclei,” A. Airapetian *et al.*, *Phys. Lett.* **B684**, 114 (2010).
- “The proton and deuteron  $F_2$  structure function at low  $Q^2$ ,” V. Tvaskis *et al.*, *Phys. Rev.* **C81**, 055207 (2010).
- “Leading-Order Determination of the Gluon Polarization from high- $p_T$  Hadron Electroproduction,” A. Airapetian *et al.*, *JHEP* **1008**,130 (2010).
- “Effects of Transversity in Deep-inelastic Scattering by Polarized Protons,” A. Airapetian *et al.*, *Phys. Lett.* **B693**, 11 (2010).
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- “Multidimensional Study of Hadronization in Nuclei,” A. Airapetian *et al.*, *Eur. Phys. J.* **A47**, 113 (2011).

- “Measurement of the virtual-photon asymmetry  $A_2$  and the spin-structure function  $g_2$  of the proton,” A. Airapetian *et al.*, *Eur. Phys. J.* **C72**, 1921 (2012).
- “Azimuthal distributions of charged hadrons, pions, and kaons produced in deep inelastic scattering off unpolarized protons and deuterons,” A. Airapetian *et al.*, *Phys. Rev.* **D87**, 012010 (2013).
- “Multiplicities of charged pions and kaons from semi-inclusive deep-inelastic scattering by the proton and the deuteron,” A. Airapetian *et al.*, *Phys. Rev.* **D87**, 074029 (2013).
- “Transverse target single-spin asymmetry in inclusive electroproduction of charged pions and kaons,” A. Airapetian *et al.*, *Phys. Lett.* **B728**, 183 (2014).
- “Reevaluation of the parton distribution of strange quarks in the nucleon,” A. Airapetian *et al.*, *Phys. Rev.* **D89**, 097101 (2014).
- “Bose-Einstein correlations in hadron-pairs from lepto-production on nuclei ranging from hydrogen to xenon,” A. Airapetian *et al.*, *Eur. Phys. J.* **C75**, 361 (2015).
- “Measurements of the separated longitudinal structure function  $F_L$  from hydrogen and deuterium targets at low  $Q^2$ ,” V. Tvaskis *et al.*, *Phys. Rev.* **C97**, 045204 (2018).

#### High Energy Exclusive Reactions

- “Measurement of Nuclear Transparencies from Exclusive  $\rho^0$  Production in Muon-Nucleus Scattering at 470 GeV,” M.R. Adams *et al.*, *Phys. Rev. Lett.* **74**, 1525 (1995).
- “Evidence for virtual Compton scattering from the proton,” J.F.J. van den Brand *et al.*, *Phys. Rev.* **D52**, 4868 (1995).
- “Observation of a coherence length effect in exclusive  $\rho^0$  electroproduction,” K. Ackerstaff *et al.*, *Phys. Rev. Lett.* **82**, 3025 (1999).
- “Exclusive leptonproduction of  $\rho^0$  mesons from hydrogen at intermediate virtual photon energies,” A. Airapetian *et al.*, *Eur. Phys. J.* **C17**, 389 (2000).
- “Measurement of angular distributions and  $R = \sigma_L/\sigma_T$  in diffractive electroproduction of  $\rho^0$  mesons,” K. Ackerstaff *et al.*, *Eur. Phys. J.* **C18**, 303 (2000).
- “Measurement of the beam spin azimuthal asymmetry associated with deeply-virtual Compton scattering,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **87**, 182001 (2001).
- “Double spin asymmetry in the cross section for exclusive  $\rho^0$  production in lepton proton scattering,” A. Airapetian *et al.*, *Phys. Lett.* **B513**, 301 (2001).
- “The  $Q^2$ -dependence of nuclear transparency for exclusive  $\rho^0$  production,” A. Airapetian *et al.*, *Phys. Rev. Lett.* **90**, 052501 (2003).

- “Double-spin asymmetries in the cross section of  $\rho^0$  and  $\phi$  production at intermediate energies,” A. Airapetian *et al.*, *Eur. Phys. J.* **C29**, 171 (2003).
- “Evidence for a narrow  $|S| = 1$  baryon state at a mass of 1528 MeV in quasi-real photoproduction,” A. Airapetian *et al.*, *Phys. Lett.* **B585**, 213 (2004).
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- “The Beam-Charge Azimuthal Asymmetry and Deeply Virtual Compton Scattering,” A. Airapetian *et al.*, *Phys. Rev.* **D75**, 011103 (2007).
- “Cross sections for hard exclusive electroproduction of  $\pi^+$  mesons on a hydrogen target,” A. Airapetian *et al.*, *Phys. Lett.* **B659**, 486 (2008).
- “Measurement of Azimuthal Asymmetries With Respect To Both Beam Charge and Transverse Target Polarization in Exclusive Electroproduction of Real Photons,” A. Airapetian *et al.*, *JHEP* **0806**, 066 (2008).
- “Spin Density Matrix Elements in Exclusive  $\rho^0$  Electroproduction on  $^1\text{H}$  and  $^2\text{H}$  Targets at 27.5 GeV Beam Energy,” A. Airapetian *et al.*, *Eur. Phys. J.* **C62**, 659 (2009).
- “Exclusive  $\rho^0$  electroproduction on transversely polarized protons,” A. Airapetian *et al.*, *Phys. Lett.* **B679**, 100 (2009).
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- “Single-spin azimuthal asymmetry in exclusive electroproduction of  $\pi^+$  mesons on transversely polarized protons,” A. Airapetian *et al.*, *Phys. Lett.* **B682**, 345 (2010).
- “Nuclear-mass dependence of azimuthal beam-helicity and beam-charge asymmetries in deeply virtual Compton scattering,” A. Airapetian *et al.*, *Phys. Rev.* **C81**, 035202 (2010).
- “Measurement of azimuthal asymmetries associated with deeply virtual Compton scattering on an unpolarized deuterium target,” A. Airapetian *et al.*, *Nucl. Phys.* **B829**, 1 (2010).
- “Exclusive Leptoproduction of Real Photons on a Longitudinally Polarized Hydrogen Target,” A. Airapetian *et al.*, *JHEP* **1006**, 019 (2010).
- “Measurement of azimuthal asymmetries associated with deeply virtual Compton scattering on a longitudinally polarized deuterium target,” A. Airapetian *et al.*, *Nucl. Phys.* **B842**, 265 (2011).
- “Ratios of Helicity Amplitudes for Exclusive  $\rho^0$  Electroproduction,” A. Airapetian *et al.*, *Eur. Phys. J.* **C71**, 1609 (2011).

- “Measurement of double-spin asymmetries associated with deeply virtual Compton scattering on a transversely polarized hydrogen target,” A. Airapetian *et al.*, *Phys. Lett.* **B704**, 15 (2011).
- “Beam-helicity and beam-charge asymmetries associated with deeply virtual Compton scattering on the unpolarised proton,” A. Airapetian *et al.*, *JHEP* **1207**, 032 (2012).
- “Beam-helicity asymmetry arising from deeply virtual Compton scattering measured with kinematically complete event reconstruction,” A. Airapetian *et al.*, *JHEP* **1210**, 042 (2012).
- “Beam-helicity asymmetry in associated electroproduction of real photons  $ep \rightarrow e\gamma\pi N$  in the  $\Delta$ -resonance region,” A. Airapetian *et al.*, *JHEP* **1401**, 077 (2014).
- “Transverse polarization of  $\Lambda$  hyperons from quasireal photoproduction on nuclei,” A. Airapetian *et al.*, *Phys. Rev.* **D90**, 072007 (2014).
- “Spin density matrix elements in exclusive  $\omega$  electroproduction on  $^1\text{H}$  and  $^2\text{H}$  targets at 27.5 GeV beam energy,” A. Airapetian *et al.*, *Eur. Phys. J.* **C74**, 3110 (2014).
- “Transverse-target-spin asymmetry in exclusive omega-meson electroproduction,” A. Airapetian *et al.*, *Eur. Phys. J.* **C75**, 600 (2015).
- “Pentaquark Theta(+) search at HERMES,” N. Akopov *et al.*, *Phys. Rev.* **D91**, 057101 (2015).
- “Search for dark photons from neutral meson decays in  $p + p$  and  $d + \text{Au}$  collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C91**, 031901 (2015).
- “Spin density matrix elements in exclusive omega electroproduction on  $^1\text{H}$  and  $^2\text{H}$  targets at 27.5 GeV beam energy,” [Erratum] A. Airapetian *et al.*, *Eur. Phys. J.* **C76**, 162 (2016).

#### Intermediate Energy Photonuclear Reactions

- “The  $^{16}\text{O}(\gamma, p_0)^{15}\text{N}$  Reaction at  $E_\gamma = 196$  MeV,” R.S. Turley, E.R. Kinney, J.L. Matthews, W.W. Sapp, E.J. Scheidker, R.A. Schumacher, S.A. Wood, G.S. Adams, R.O. Owens, *Phys. Lett.* **157B**, 19 (1985).
- “Measurement of the Differential Cross Section for the Reaction  $^2\text{H}(\gamma, p)n$  at High Photon Energies and  $\theta_{c.m.} = 90^\circ$ ,” J. Napolitano, S.J. Freedman, D.F. Geesaman, R. Gilman, M.C. Green, R.J. Holt, H.E. Jackson, R. Kowalczyk, C. Marchand, J. Nelson, B. Zeidman, D. Beck, G. Boyd, D. Collins, B.W. Filippone, J. Jourdan, R.D. McKeown, R. Milner, D. Potterveld, R. Walker, C. Woodward, R.E. Segel, T.-Y. Tung, P.E. Bosted, E.R. Kinney, Z.-E. Meziani, R. Minehart, *Phys. Rev. Lett.* **61**, 2530 (1988).
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- “Momentum Transfer Dependence of Nuclear Transparency from the Quasielastic  $^{12}\text{C}(e, e'p)$  Reaction,” N.C.R. Makins *et al.*, *Phys. Rev. Lett.* **72**, 1986 (1994).
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- “Quasi-free (e,e’p) Reactions and Proton Propagation in Nuclei,” D. Abbott *et al.*, *Phys. Rev. Lett.* **80**, 5072 (1998).
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- “Polarization Measurements In High-Energy Deuteron Photodisintegration,” K. Wijesooriya *et al.*, *Phys. Rev. Lett.* **86**, 2975 (2001).
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- “Measurements of the elastic electromagnetic form factor ratio  $\mu_p G_{Ep}/G_{Mp}$  via polarization transfer,” O. Gayou *et al.*, *Phys. Rev.* **C64**, 038202 (2001).
- “Longitudinal Electroproduction Of Charged Pions From  $^1\text{H}$ ,  $^2\text{H}$ ,  $^3\text{He}$ ,” D. Gaskell *et al.*, *Phys. Rev. Lett.* **87**, 202301 (2001).
- “Measurement of longitudinal and transverse cross sections in the  $^3\text{He}(e, e'\pi^+)^3\text{H}$  reaction at  $W = 1.6$  GeV,” D. Gaskell *et al.*, *Phys. Rev.* **C65**, 011001 (2002).
- “Polarization measurements in neutral pion photoproduction,” K. Wijesooriya *et al.*, *Phys. Rev.* **C66**, 034614 (2002).
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- “Nuclear transparency with the  $\gamma n \rightarrow \pi^- p$  process in  $^4\text{He}$ ,” D. Dutta *et al.*, *Phys. Rev.* **C68**, 021001 (2003).
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#### Intermediate Energy Hadronic Reactions

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- “ $\phi$  meson production in  $d+Au$  collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C92**, 044909 (2015).
- “Measurement of higher cumulants of net-charge multiplicity distributions in  $Au+Au$  collisions at  $\sqrt{s_{NN}} = 7.7 - 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 011901 (2016).
- “Transverse energy production and charged-particle multiplicity at midrapidity in various systems from  $\sqrt{s_{NN}} = 7.7$  to  $200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 024901 (2016).
- “ $\phi$  meson production in the forward/backward rapidity region in  $Cu+Au$  collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 024904 (2016).

- “Scaling properties of fractional momentum loss of high- $p_T$  hadrons in nucleus-nucleus collisions at  $\sqrt{s_{NN}}$  from 62.4 GeV to 2.76 TeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 024911 (2016).
- “Single electron yields from semileptonic charm and bottom hadron decays in Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 034904 (2016).
- “Centrality-dependent modification of jet-production rates in deuteron-gold collisions at  $\sqrt{s_{NN}}=200$  GeV,” A. Adare *et al.*, *Phys. Rev. Lett.* **116**, 122301 (2016).
- “Measurement of the higher-order anisotropic flow coefficients for identified hadrons in Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 051902 (2016).
- “Dielectron production in Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C93**, 014904 (2016).
- “Azimuthally anisotropic emission of low-momentum direct photons in Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C94**, 064901 (2016).
- “Measurements of  $e^+e^-$  pairs from open heavy flavor in  $p+p$  and  $d+A$  collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C96**, 024907 (2017).
- “Lévy-stable two-pion Bose-Einstein correlations in  $\sqrt{s_{NN}} = 200$  GeV Au+Au collisions,” A. Adare *et al.*, *Phys. Rev.* **C97**, 064911 (2018).
- “Measurement of emission angle anisotropy via long-range angular correlations with high  $p_T$  hadrons in  $d+Au$  and  $p + p$  collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C98**, 014912 (2018).
- “Low-momentum direct photon measurement in Cu+Cu collisions at  $\sqrt{s_{NN}} = 200$  GeV,” A. Adare *et al.*, *Phys. Rev.* **C98**, 054902 (2018).

#### Nuclear Instrumentation and Targets

- “A Simple Light Guide for Coupling to Thin Scintillator Sheets,” E.R. Kinney, J.L. Matthews, W.W. Sapp, R.A. Schumacher, R.O. Owens, *Nucl. Instr. and Meth.* **185**, 189 (1981).
- “Spin-Exchange Optical Pumping as a Source of Spin-Polarized Atomic Deuterium,” K.P. Coulter, R.J. Holt, E.R. Kinney, R.S. Kowalczyk, D.H. Potterveld, L. Young, B. Zeidman, A. Zghiche, D.K. Toporkov, *Phys. Rev. Lett.* **68**, 174 (1992).
- “A Polarized Gas Internal Target Using a Storage Cell in an Electron Storage Ring”, R. Gilman, R.J. Holt, E.R. Kinney, R.S. Kowalczyk, J. Napolitano, A.W. Nikitin, D.M. Nikolenko, S.G. Popov, D.H. Potterveld, I.A. Rachek, D.K. Toporkov, E.P. Tsentalovich, B.B. Wojtsekhowski, L. Young, *Nucl. Instr. and Meth.* **A327**, 277 (1993).

- “An Active Storage Cell for a Polarized Gas Internal Target”, K.P. Coulter, R. Gilman, R.J. Holt, L.G. Isaeva, E.R. Kinney, R.S. Kowalczyk, S.I. Mishnev, J. Napolitano, D.M. Nikolenko, S.G. Popov, D.H. Potterveld, I.A. Rachek, A.V. Sukhanov, A.B. Temnykh, D.K. Toporkov, E.P. Tsentalovich, B.B. Wojtsekhowski, L. Young, A. Zghiche, *Nucl. Instr. and Meth.* **A350**, 423 (1994).
- “The HERMES Spectrometer,” K. Ackerstaff *et al.*, *Nucl. Instr. and Meth.* **A417**, 230 (1998).
- “The HERMES polarized  $^3\text{He}$  internal gas target,” D. DeSchepper *et al.*, *Nucl. Instr. and Meth.* **A419**, 16 (1998).
- “Beam-induced Nuclear Depolarization in a Gaseous Polarized Hydrogen Target,” K. Ackerstaff *et al.*, *Phys. Rev. Lett.* **82**, 1164 (1999).
- “The Hermes Forward Tracking Chambers: Construction, Operation, and Aging Effects,” J. T. Brack *et al.*, *Nucl. Instrum. Meth.* **A469**, 47 (2001).
- “A test of high-energy electron bremsstrahlung calculations,” M. Yuly, J. Mittelstaedt, E.R. Kinney, C. Maher, J.L. Matthews, W.W. Sapp, T. Soos and R.O. Owens, *Nucl. Instrum. Meth.* **A488**, 262 (2002).
- “Experimental test of virtual photon theory via electrodisintegration and photodisintegration of the deuteron,” M. Yuly, J. Mittelstaedt, J.L. Matthews, E.R. Kinney, C. Maher, W.W. Sapp, T. Soos and R.O. Owens, *Phys. Rev.* **C68**, 014601 (2003).
- “Nuclear polarization of molecular hydrogen recombined on a non-metallic surface,” A. Airapetian *et al.*, *Eur. Phys. J.* **D29** 21 (2004).
- “The HERMES polarized hydrogen and deuterium gas target in the HERA electron storage ring,” A. Airapetian *et al.*, *Nucl. Instrum. Meth.* **A540**, 68 (2005).
- “The SeaQuest Spectrometer at Fermilab,” C.A. Aidala *et al.*, *Nucl. Instrum. Meth.* **A930**, 49 (2019).

### Published Proceedings of Invited Presentations

- “Internal Polarized Targets,” E.R. Kinney, K. Coulter, R. Gilman, R.J. Holt, R.S. Kowalczyk, J. Napolitano, D.H. Potterveld, L. Young, S.I. Mishnev, D.M. Nikolenko, S.G. Popov, I.A. Rachek, A.B. Temnykh, D.K. Toporkov, E.P. Tsentalovich, B.B. Wojtsekhowski, Proc. of the Indiana University Cyclotron Facility Workshop on “Physics with Polarized Beams on Polarized Targets,” Indiana, 1989, eds. J. Sowinski, S.E. Vigdor, World Scientific, Singapore, p. 349, 1990.
- “Realizations of Polarized Targets in Storage Rings,” E.R. Kinney, Proc. of the 12th Int. Conf. on Particles and Nuclei (PANIC XII), MIT, (Cambridge), *Nucl. Phys.* **A527**, 827c (1991).
- “Depolarization of Atomic Targets by Beam-Induced Magnetic Fields,” E.R. Kinney, Proc. Workshop on Polarized Gas Targets for Storage Rings (Heidelberg 1991), eds. H.G. Gaul, E. Steffens, and K.Zapfe, MPI-Heidelberg, p. 155 (1992).

- “Beam-induced target depolarization,” E.R. Kinney, Proc. Workshop on Polarized Ion Sources and Polarized Gas Targets (Madison 1993), eds. L.W. Anderson and W. Haeberli, AIP Press, New York, pp. 278-281 (1994).
- “Planned Future Measurements At Polarized Fixed-Target Experiments,” E.R. Kinney, Proc. Workshop on Polarized Protons at High Energies, Hamburg 1999, eds. A. de Roeck, D. Barber, and G. Raedel, DESY-PROC-1999-03, 92 (1999).
- “Spin Structure Studies With Polarized Leptons,” E.R. Kinney, Proc. Workshop on the Structure of the Nucleon (Nucleon99), Frascati, 1999, *Nucl. Phys.* **A666**, 267 (2000).
- “Three-nucleon interactions: Evidence from Polarized  $pd$  Elastic Scattering,” E.R. Kinney *et al.*, Proc. 27th Eur. Conf. on Few-Body Problems in Physics, Evora 2000, *Nucl. Phys.* **A689**, 33 (2001).

### Reports and contributions to published proceedings

- “Inclusive Pion Double Charge Exchange in  $^4\text{He}$ ,” *Progress at LAMPF*, p. 61, 1984.
- “A Dependence of Inclusive Pion Double Charge Exchange,” *Progress at LAMPF*, p. 96, 1985.
- “An Accurate, Absolute Measurement of the Differential Cross Section for the Photo-disintegration of the Deuteron,” *Bates Linear Accelerator Center Annual Report*, p. 128, 1985.
- “Systematics of Inclusive Double Charge Exchange,” *Progress at LAMPF*, p. 73, 1987.
- “Inclusive Pion Double Charge Exchange in  $^4\text{He}$  at Intermediate Energies,” Ph.D. thesis, E.R. Kinney, Los Alamos National Laboratory Report No. LA-11417-T, 1988 (unpublished).
- “Two-body Disintegration of the Deuteron with 0.8-1.8 GeV Photons,” S.J. Freedman, D.F. Geesaman, R. Gilman, M.C. Green, R.J. Holt, H.E. Jackson, E.R. Kinney, R. Kowalczyk, C. Marchand, J. Napolitano, J. Nelson, D. Potterveld, B. Zeitman, R.E. Segel, T.-Y. Tung, D. Beck, G. Boyd, D. Collins, B.W. Filippone, J. Jourdan, R.D. McKeown, R. Milner, R. Walker, C. Woodward, P.E. Bosted, Z.-E. Meziani, R. Minehart, Proc. Int. Symp. on Weak and Electromagnetic Interactions in Nuclei, Montreal 1989, P. Depommier, ed., Éditions Frontières, Gif-sur-Yvette, France, p. 799 (1989).
- “Report from the Workshop on Computing Directions and Options for Data Acquisition and Analysis at LAMPF,” M.A. Othoudt, M.V. Hoehn, J.F. Amann, C.B. Bemis, T.A. Carey, P.S. Cooper, G.P. Cort, J.F. Harrison, E.R. Kinney, T. Kozlowski, S.C. Loken, W.C. Louis, R.E. Mischke, J.M. Wouters, Los Alamos National Laboratory Report No. LA-11662-MS, 1989 (unpublished).
- “Inclusive pion single charge exchange in  $^4\text{He}$  in the  $\Delta$ -resonance region,” M. Wang, E.R. Kinney, M. Dowell, W. Fong, P.A.M. Gram, S. Høibråten, J.L. Matthews,

- H. Park, G.A. Rebka, Jr., D.A. Roberts, L.C. Smith, R.M. Whitton, M. Yuly, Particles and Nuclei XIII International Conference, Perugia, June 1993, p. 566 (1993).
- “Semi-inclusive studies of the quark spin and flavor structure of the proton,” U. Stöblein and E.R. Kinney, Proc. 2nd Workshop on Physics with a Polarized Electron Light Ion Collider, MIT 2000, *AIP Conf. Proc.* **588**, 171 (2001).
- “Future possibilities for lepton hadron collider physics and detectors,” G. Fleming, E. Kinney, S. Lammers and S. Magill, *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. N. Graf, eConf **C010630**, E406 (2001).
- “Summary: Working group on QCD and strong interactions,” E. L. Berger *et al.*, *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. N. Graf, eConf **C010630**, P5001 (2001).
- “Nuclear Structure At The Cipanp Conference Summary,” J. Arrington, E. Kinney and F. Yuan, *Proc. Intersections of Particle and Nuclear Physics: 9th Conference CIPAN2006*, ed. T.M. Liss, Rio Grande, Puerto Rico, June 2006, *AIP Conf. Proc.* **870** 152 (2006).
- “Drell-Yan Measurements of Light Antiquarks in the Nucleon and in Nuclei,” 18th Int. Conf. on Particles and Nuclei (PANIC08), Eilat, Israel, Nov. 9-14, 2008, *Nucl. Phys.* **A827**, 330 (2009).

### Invited Presentations and Colloquia

- “Pictures of the Deuteron using High Energy Light,” Physics Dept. Colloquium, New Mexico State University, Las Cruces, November 1991.
- “Status of Nucleon Spin Structure Measurements,” 5th Int. Symp. on Meson-Nucleon Physics and the Structure of the Nucleon, Boulder, September 1993.
- “New Measurements of the Nucleon’s Spin Structure,” Physics Dept. Colloquium, Colorado School of Mines, Golden, February 1994.
- “First Results and future directions from HERMES,” 1996 Gordon Research Conf. on Photonuclear Reactions, Tilton, 1996.
- “The HERMES Spectrometer,” Int. ELFE Workshop, St. Malo, 1996.
- “Status of the HERMES Experiment,” Program Review Committee of the Deutsches Elektronen Synchrotron, Hamburg, 1997.
- “New Results from the HERMES Experiment,” Invited talk, 1998 Joint Meeting of the American Physical Society and the American Association of Physics Teachers, Columbus, OH, April 1998.
- “Status of the HERMES Experiment,” Program Review Committee of the Deutsches Elektronen Synchrotron, Hamburg, 1998 (2).

- “Perspectives for DIS Experiments at HERMES,” Int. Workshop on “The Role of the Nuclear Medium in Deep Inelastic Scattering,” Trento, 1999.
- “Status and Plans of the HERMES Experiment,” Program Review Committee of the Deutsches Elektronen Synchrotron, Hamburg, 1999.
- “The Nucleon’s Spin: A rather complicated  $1/2 \hbar$ ,” Physics Colloquium, Paul Scherrer Institute, Villigen, Switzerland 1999.
- “The Nucleon’s Spin: A rather complicated  $1/2 \hbar$ ,” Physics Dept. Colloquium, University of Colorado, Boulder, 1999.
- “The Spin Structure of the Nucleon,” 20th Int. Conf. on Physics in Collision, Lisbon, 2000.
- “Semi-inclusive Results from HERMES,” Workshop on Nucleon Structure in the High X-Bjorken Limit, Philadelphia, 2000.
- “Summary of EPIC Physics Case,” 2nd Workshop on Physics with an Electron-Ion Collider, MIT, 2000.
- “Recent Results and Future Experiments at Nuclear Physics Facilities,” Snowmass Conf., P5 Working Group, July 2001.
- “Recent Results from the HERMES Experiment and future measurements of the spin structure,” Snowmass Conf., Working Group on Fixed Target Experiments, July 2001.
- “Recent Progress from High-Energy Lepton Scattering from Nucleons and Nuclei,” Invited Talk, 2001 Joint Meeting of the Div. of Nuclear Physics, American Physical Society and Japanese Physical Society, Maui, October 2001.
- “Experimental Exploration of Exclusive Processes at HERMES,” Workshop on Physics with Antiprotons at GSI, Darmstadt, 2002.
- “Forward and Non-forward Parton Distributions from HERMES,” SLAC Summer Institute and Topical Conference, SLAC, August 2002.
- “Putting the Proton under a Femtometer Microscope,” Physics Dept. Colloquium, University of Wyoming, Laramie, November 2002.
- “Summary: Working Group on Physics with a Polarized electron nucleon Collider,” First HERA-III Workshop The New Frontier in Precision Lepton-Nucleon Physics, Munich 2002.
- “The Spin Structure of the Nucleon,” Five lectures at Hampton University Graduate Summer School, June 2003.
- “The Quark-Gluon Structure of the Proton: Now in 3D,” Physics Dept. Colloquium, Colorado School of Mines, Golden, September 2003.
- “Compton Scattering from Quarks and Gluons,” Physics Dept. Colloquium, University of Colorado, Boulder, October 2003.

- “Polarized Semi-inclusive Physics Measurements at HERMES and Future Prospects at the Colliders,” 2nd Electron-Ion Collider Workshop, Jefferson Lab, March 15-17, 2004.
- “Physics with a Future Electron-Ion Collider,” Two lectures at Hampton University Graduate Summer School, June 2004.
- “Measurement of Quark Hadronization in a Nuclear Environment,” 21st Winter Workshop on Nuclear Dynamics, Breckenridge, February 5-12, 2005.
- “Hadronization within the Nuclear Environment,” Invited Talk, 2nd Joint Meeting of the American Physical Society Div. of Nuclear Physics and the Physical Society of Japan, Maui, September 18-22, 2005.
- “Inclusive and semi-inclusive physics at eRHIC,” Workshop on New Frontiers at RHIC, Int. Conf. on Particles and Nuclei, Sante Fe, October 22-30, 2005.
- “Hadronization with the Nuclear Environment,” Nuclear Physics Seminar, Los Alamos National Laboratory, Los Alamos, February 8, 2006.
- “Hadronization with the Nuclear Environment,” Nuclear Physics Seminar, Indiana University Cyclotron Facility, Bloomington, April 14, 2006.
- “Spin Results from HERMES,” Invited Talk, Workshop on Spin Structure of the Nucleon, Annual Meeting of the APS Div. of Nuclear Physics, Nashville, October 25-28, 2006.
- “Semi-inclusive deep inelastic scattering at HERMES and at the proposed EIC,” RIKEN-BNL Workshop on Parity Violating Spin Asymmetries at RHIC, April 26-27, 2007.
- “EIC Project Status: A Personal View,” 4th Electron-Ion Collider Workshop, Hampton, VA, May 19-23, 2008.
- “Spin Structure Studies at an Electron-Ion Collider,” Int. Workshop in Deep Inelastic Scattering (DIS2009), Madrid, Spain, April 2009.
- “HERMES and the Renaissance of Transverse Momenta in Deep Inelastic Scattering,” Colloquium, Massachusetts Institute of Technology Laboratory for Nuclear Science, November 29, 2010.
- “Inclusive Quasi-real Photoproduction Measurements at HERMES,” Int. Conf. on Intersections in Particle and Nuclear Phys. (CIPANP15), Vail, CO, May 2015.
- “Testing of the SIDIS framework at Jefferson Lab Hall C using precise measurements of light meson Electroproduction.” Int. Conf on Deep Inelastic Scattering (DIS2017), Birmingham, UK, April 2017.

### **Recent Contributed Presentations**

- “New Results from HERMES,” Int. Conf. on Intersections between Particle and Nuclear Physics, Big Sky, 1997.



- “Results on Polarized and Unpolarized Quark Distributions of the Nucleon from the HERMES Experiment,” International Nuclear Physics Conference, Paris, 1998.
- “Physics with EPIC, a high luminosity Electron Polarized Ion Collider,” 14th Int. Spin Physics Symp., Osaka 2000.
- “Three-body Force Effects in Proton-Deuteron Elastic Scattering,” 14th Int. Spin Physics Symp., Osaka 2000.
- “Spin-density Matrix Elements for Diffractive Vector Meson Production,” 14th Int. Spin Physics Symp., Osaka 2000.
- “Thoughts on Measuring  $\Delta s$  in Semi-inclusive DIS,” RIKEN Summer Workshop on “Current and Future Directions at RHIC,” Brookhaven National Laboratory, August 2002.
- “Measurements of Quark Hadronization in a Nuclear Environment,” Int. Conf. on Intersections between Particle and Nuclear Physics, New York, 2003.
- “Measurements of Quark Hadronization in a Nuclear Environment,” APS Division of Nuclear Physics Meeting, Tucson, 2003.
- “Experimental Issues in W Physics at PHENIX,” Workshop on Low-x and W Physics, University of Illinois, Urbana, Nov 2003.
- “Measurement of single-spin azimuthal asymmetries in semi-inclusive electroproduction of mesons,” 16th Int. Spin Phys. Symp. Trieste, October 11-16, 2004.
- “Proposed Upgrades of the PHENIX Forward Spectrometers for Spin Physics,” 16th Int. Spin Phys. Symp. Trieste, October 11-16, 2004.
- “New Results on  $\rho^0$  Production at HERMES,” 17th Int. Spin Physics Symp., Kyoto, Japan, October 2-7, 2006.
- “HERMES Measurements of the Collins and Sivers Asymmetries from a Transversely Polarized Hydrogen Target,” APS Division of Nuclear Physics Fall Meeting, Newport News, VA, October 11-13, 2007.
- “Polarized PDFs with Semi-inclusive DIS with an EIC,” 4th Electron-Ion Collider Workshop, Hampton, VA, May 19-23, 2008.
- “Exploring 3D Distributions at HERMES: Latest Results on Sivers Asymmetries and DVCS Amplitudes,” APS Division of Nuclear Physics Fall Meeting, Oakland, CA, October 23-26, 2008.
- “Drell-Yan Measurements of Light Antiquarks in the Nucleon and in Nuclei,” 18th Int. Conf. on Particles and Nuclei (PANIC08), Eilat, Israel, Nov. 9-14, 2008.
- “The Hall C SIDIS program towards understanding the transverse momentum dependence of valence quarks,” APS Division of Nuclear Physics Fall Meeting, Annual Meeting, Santa Fe, NM, October 2015.

## SUMMARY OF UNIVERSITY ACTIVITIES

### Contracts and Grants

Originally, the Nuclear Physics Laboratory had a single umbrella grant with the US Department of Energy, Nuclear Physics Division, for which a new proposal was reviewed every three years. The progress of the Laboratory was reviewed annually. All of the active faculty of NPL were individually responsible for proposing and carrying out their own research programs within this large proposal, thus the role of the Principal Investigator (PI) was primarily differentiated from that of Co-Principal Investigator (Co-PI) by the responsibility of administration of the Laboratory. After the retirement of most of the senior faculty in nuclear physics, this grant became a single PI grant. In 2015, funding from the National Science Foundation began under a new single PI grant.

#### *US Department of Energy*

Experimental Intermediate Energy Nuclear Physics

Co-PI	February 15, 1991 – February 14, 1992	\$520,000
Co-PI	February 15, 1992 – February 14, 1995	\$1,665,000
Co-PI	February 15, 1995 – February 14, 1998	\$1,704,000
Co-PI	February 15, 1998 – February 14, 2001	\$1,788,000
Co-PI/PI	February 15, 2001 – February 14, 2004	\$1,500,000
PI	February 15, 2004 – February 14, 2007	\$1,365,000
PI	February 15, 2007 – September 30, 2012	\$1,188,000
PI	June 1, 2015 – May 31, 2019	\$950,000

In addition, as new projects require, requests for supplemental funds are submitted to the US DOE and other agencies.

### Supplemental Funds Requests of ERK

#### *Continuous Electron Beam Accelerator Facility (CEBAF)*

A Gas Cherenkov Detector for the CEBAF SOS Spectrometer

February 15, 1992 – July 15, 1994 \$16,127

#### *US Department of Energy*

Front Drift Chambers FC1/2 for the HERMES Experiment

February 15, 1994 – October 14, 1996 \$415,000

#### *US Department of Energy*

Operating Expenses for the NPL group of HERMES

February 15, 1994 – February 14, 1995 \$35,000

#### *University Research Association (Fermilab)*

Visiting Scholar Program, “Quark Energy Loss in Nuclear Matter”

June 1, 2014 – November 30, 2014 \$15,000

**Teaching  
Courses Taught**

	<b>Spring</b>	<b>Summer</b>	<b>Fall</b>
1991	N/A	N/A	PHYS 2010 General Physics Lab/Recitation 57 Students
1992	PHYS 1020 General Physics Lecture 85 Students	—	PHYS 7710 Nuclear Physics Lecture 5 Students PHYS 2010 General Physics Lab/Recitation 28 Students
1993	PHYS 1000 Basic Physics Lecture/Lab 28 Students	—	PHYS 3310 Electromagnetism I Lecture 31 Students
1994	PHYS 3320 Electromagnetism II Lecture 27 Students	—	PHYS 3310 Electromagnetism I Lecture 37 Students PHYS 1140 Experimental Physics I Laboratory 21 Students
1995	PHYS 3320 Electromagnetism II Lecture 30 Students	—	—
1996	PHYS 3320 Electromagnetism II Lecture 20 Students	—	PHYS 2010 General Physics I Lecture 528 Students
1997	PHYS 3210 Analytic Mechanics Lecture 23 Students	—	—
1998	—	—	—
1999	—	—	PHYS 1000 Preparatory Physics Lecture 65 Students

2000	PHYS 2170 Foundations of Modern Physics Lecture 17 Students	–	PHYS 1000 Preparatory Physics Lecture 67 Students
2001	PHYS 2170 Foundations of Modern Physics Lecture 29 Students	–	PHYS 3330 Electronics for the Physical Sciences Lecture/Lab 16 Students
2002	PHYS 1110 General Physics I Lecture 550 Students	–	PHYS 3330 Electronics for the Physical Sciences Lecture/Lab 15 Students
2003	PHYS 2010 General Physics I Lecture 270 Students	–	PHYS 3330 Electronics for the Physical Sciences Lecture/Lab 10 Students
2004	PHYS 2010 General Physics I Lecture 300 Students	–	PHYS 1110 General Physics I (calculus based) Lecture 573 Students
2005	PHYS 4230 Stat. Mech. and Thermodynamics Lecture 20 Students	–	–
2006	–	–	PHYS 1110 General Physics I (calculus based) Lecture 608 students
2007	PHYS 4230 Stat. Mech. and Thermodynamics Lecture 20 Students	–	–
2008	–	–	PHYS 3310 Princ. of Electricity and Magnetism I Lecture 52 students
2009	PHYS 3310 Princ. of Electricity and Magnetism I Lecture 37 Students	–	PHYS 3320 Princ. of Electricity and Magnetism II Lecture 38 Students
2010	PHYS 3330 Electronics for the Physical Sciences Lecture/Lab 17 Students	–	PHYS 3330 Electronics for the Physical Sciences Lecture/Lab 16 students

2011	PHYS 3320 Princ. of Electricity and Magnetism II Lecture 48 Students	–	PHYS 2010 General Physics 1 Lecture 434 Students
2012	PHYS 1240 Sound and Music Lecture 139 Students	–	PHYS1240 Sound and Music Lecture 131 Students
2013	PHYS 1120 General Physics 2 (Calculus-based) Lecture 589 Students	–	–
2014	–	–	PHYS1240 Sound and Music Lecture 115 Students
2015	PHYS1110 General Physics 1 (Calculus-based) Backup/Logistics 694 Students	–	PHYS3330 Electronics for the Physical Sciences Lab/Lecture 14 Students
2016	PHYS4230 Stat. Mechanics and Thermodynamics Lecture 35 Students	–	PHYS1120 General Physics 2 (Calculus-based) Backup/Logistics 711 Students
2017	PHYS1110 General Physics 1 (Calculus-based) Backup/Logistics 889 Students	–	PHYS1120 General Physics 2 (Calculus-based) Backup/Logistics 649 Students
2018	PHYS2010 General Physics 1 (Algebra-based) Lecture 241 Students	–	PHYS1120 General Physics 2 (Calculus-based) Backup/Logistics 613 Students
2019	PHYS2010 General Physics 1 (Algebra-based) Lecture 238 Students	–	–

### Undergraduate Research Students

Radu Frangopol	Undeclared	Lab Technician	5/93–9/93
Seamus Clark	Physics B.A. (Honors)	HERMES Drift Chambers	1/94–5/95
C.D. Hoyle	Physics B.A. (Honors)	Aging of HERMES Chambers	6/95–5/96
Matthew Pallas	Physics B.A. (Honors)	$P_T$ Broadening in DIS in Nuclei	6/02–6/04
Sean Keyes	Physics B.A.	Monte Carlo Studies of Hadron and Anti-hadron Production	6/03–6/04
Chris Edelmeier	Physics B.A.	$W$ Boson production	

Keegan Wilson	Physics B.A.	in polarized $pp$ collisions Direct Photon production	6/04–6/07
Colin West	Eng. Physics B.S.	in polarized $pp$ collision MWPC for Fermilab Drell-Yan Experiment E906	6/04–12/06 1/09–5/10
Joshua Braverman	B.S.	Gas System for MWPC Prototype Experiment E906	6/09–7/10
David Sprinzen	B.S.	Electronics Readout for MWPC Experiment E906	1/10–8/10
Steve MacCoun	B.S.	MWPC Prototype for E906 Experiment E906	1/10–8/10
Reid Lewis	B.S.	MWPC Readout Controls for E906 Experiment E906	9/10–5/11
Brian MacDonald	B.S.	Study of Drift Chamber Gas Performance Experiment E906	9/12–11/13

**Graduate Research Students** (I am or was Principal Advisor)

Michael Keilman	Physics Ph.D.	Pion Single Charge Exchange	4/92–9/94
Derek VanWestrum	Physics Ph.D.	Quasifree Electron Scattering	5/94–6/98
Keith Nordstrom	Physics Ph.D.	Beam Depolarization Theory	5/94–5/95
Gregory Rakness	Physics Ph.D.	Phi Meson Production at HERMES	1/95–8/00
William Kirwin	Physics Ph.D.	Charm Production at HERMES	9/96–8/97
James Ely	Physics Ph.D.	Deeply Virtual Compton Scattering	6/97–7/02
Kristin Kiriluk	Physics M.S.	$W$ Boson Production at RHIC	9/05–12/06
Joseph Seele	Physics Ph.D.	Double Spin Asymmetry for $\eta$ /RHIC	6/03–12/08
Jeremy Nuger	Physics M.S.	$Z$ Boson Production at RHIC	6/08–10/09
Po-Ju Lin	Physics Ph.D.	Drell-Yan Process at 120 GeV	8/09–8/17

**Postdoctoral Scholars**

James Williams	Cherenkov Detector Design/Prototype	6/92–9/93
David Mercer	Design HERMES Drift chambers	1/94–2/96
Eric Belz	HERMES/CEBAF Electron Experiments	1/94–1/96
Brendan Fox	HERMES/TJNAF Electron Experiments	8/96–1/01
Uta Stoesslein	HERMES/TJNAF Electron Experiments	3/00–8/02
David Gaskell	HERMES/TJNAF Electron Experiments	8/01–9/02
Alexander Kisselev	HERMES Electron Experiments	11/02–3/05
Frank Ellinghaus	HERMES/RHIC Spin Experiments	8/03–8/08
Andrew Glenn	RHIC Spin Experiments	10/04–6/08
Alberto de la Ossa	HERMES Spin Experiment	5/08–9/10
Joseph Katich	Fermilab E906 Drell-Yan Experiment	10/10–01/15

## Service

### University Service

Physics Department Committees:

Fall 1991	Comprehensive Examination Committee
Fall 1991	Graduate Committee
Spring 1992	Graduate Committee
Fall 1992	Nuclear Theory Faculty Search Committee
Fall 1992	Graduate Committee
Spring 1993	Graduate Committee
Spring 1993	Nuclear Theory Faculty Search Committee
Fall 1993	Chair of Junior Faculty Steering Committee
Fall 1993	Graduate Committee
Fall 1993	Physics Department Evaluation Panel
Fall 1993	Chair of Precision Shop Supervisory Committee
Spring 1994	Chair of Junior Faculty Steering Committee
Spring 1994	Physics Department Evaluation Panel
Spring 1994	Chair of Precision Shop Supervisory Committee
Fall 1994	Chair of Junior Faculty Steering Committee
Fall 1994	Chair of Precision Shop Supervisory Committee
Fall 1994	Physics Department Curriculum Committee
Fall 1994	Physics Department Chair's Advisory Committee
Spring 1995	Physics Department Chair's Advisory Committee
Spring 1995	Chair of Precision Shop Supervisory Committee
Spring 1995	Chair of Junior Faculty Steering Committee
Fall 1995	Physics Department Chair's Advisory Committee
Fall 1995	Chair of Precision Shop Supervisory Committee
Fall 1995	Chair of Junior Faculty Steering Committee
Spring 1996	Physics Department Chair's Advisory Committee
Spring 1996	Chair of Precision Shop Supervisory Committee
Spring 1996	Chair of Junior Faculty Steering Committee
Fall 1996	Chair of Precision Shop Supervisory Committee
Fall 1996	Chair of Junior Faculty Steering Committee
Spring 1997	Chair of Precision Shop Supervisory Committee
Spring 1997	Chair of Junior Faculty Steering Committee
Fall 1999	Diversity Committee
Fall 1999	Program Review Committee
Spring 2000	Diversity Committee
Spring 2000	Program Review Committee
Fall 2000	Diversity Committee
Fall 2000	Program Review Committee
Fall 2000	Chair of Nuclear Search Committee
Spring 2001	Diversity Committee
Spring 2001	Program Review Committee
Spring 2001	Chair of Nuclear Search Committee

Fall 2001	Diversity Committee
Fall 2001	Chair of Nuclear Search Committee
Spring 2002	Diversity Committee
Spring 2002	Chair of Nuclear Search Committee
Fall 2002	Chair of Diversity Committee
Fall 2002	Evaluation Committee
Fall 2002	Undergraduate Committee
Spring 2003	Chair of Diversity Committee
Spring 2003	Evaluation Committee
Spring 2003	Undergraduate Committee
Fall 2003	Graduate Committee
Fall 2003	Undergraduate Committee
Spring 2004	Undergraduate Committee
Spring 2004	Graduate Committee
Fall 2004	Undergraduate Committee (Chair)
Fall 2004	Evaluation Committee
Fall 2004	Chairman's Advisory Committee
Spring 2005	Undergraduate Committee (Chair)
Spring 2005	Evaluation Committee
Spring 2005	Chairman's Advisory Committee
Fall 2006	Diversity Committee (Chair)
Fall 2006	Plasma Physics Faculty Search Committee
Fall 2006	Graduate Committee
Spring 2007	Diversity Committee (Chair)
Spring 2007	Plasma Physics Faculty Search Committee
Spring 2007	Graduate Committee
Fall 2007	Diversity Committee (Chair)
Fall 2007	Graduate Committee
Fall 2007	Department Website Committee (Chair)
Spring 2008	Diversity Committee (Chair)
Spring 2008	Department Website Committee (Chair)
Spring 2008	Graduate Committee
Fall 2008	Department Website Committee (Chair)
Fall 2008	Evaluation Panel
Spring 2009	Department Website Committee (Chair)
Spring 2009	Evaluation Panel
Fall 2009	Department Website Committee (Chair)
Fall 2009	Evaluation Panel
Spring 2010	Department Website Committee (Chair)
Spring 2010	Evaluation Panel
Fall 2010	Teaching Evaluation Committee (Chair)
Fall 2010	Graduate Committee
Fall 2010	Nuclear Theorist Search Committee
Spring 2011	Teaching Evaluation Committee (Chair)
Spring 2011	Graduate Committee
Fall 2011	Evaluation Panel



Spring 2012	Evaluation Panel
Fall 2012	Teaching Evaluation Committee
Spring 2013	Teaching Evaluation Committee
Fall 2014	Teaching Evaluation Committee
Fall 2014	Department Mentoring Committee (Chair)
Spring 2015	Teaching Evaluation Committee
Spring 2015	Department Mentoring Committee (Chair)
Fall 2015	Evaluation Panel
Fall 2015	Chair Election Committee
Fall 2015	Faculty Search Committee, Nuclear Exp.
Spring 2016	Evaluation Panel
Spring 2016	Chair Election Committee
Spring 2016	Faculty Search Committee, Nuclear Exp.
Fall 2016	Teaching Evaluation Committee
Fall 2016	G-wing Improvements Committee
Fall 2016	Strategic Research Plan Committee
Spring 2017	Teaching Evaluation Committee
Spring 2017	G-wing Improvements Committee
Spring 2017	Strategic Research Plan Committee
Fall 2017	Teaching Evaluation Committee
Fall 2017	G-wing Improvements Committee
Fall 2017	Strategic Research Plan Committee
Fall 2017	Instructor Search Committee
Spring 2018	Teaching Evaluation Committee
Spring 2018	G-wing Improvements Committee
Spring 2018	Strategic Research Plan Committee
Fall 2018	Teaching Evaluation Committee
Fall 2018	G-wing Improvements Committee
Fall 2018	Comprehensive Exam 2 Committee
Spring 2019	Teaching Evaluation Committee
Spring 2019	G-wing Improvements Committee
Spring 2019	Comprehensive Exam 2 Committee

Graduate School Committees:

Fall 1992 - Spring 1997, Graduate Curriculum Committee

Fall 1999 - Fall 2004, Graduate Curriculum Committee

Boulder Faculty Assembly Committee:

Fall 1996                      Committee on Academic Planning, Practices, and Standards

Spring 1997                   Committee on Academic Planning, Practices, and Standards

### Faculty Excellence Teaching Program

2/93	Presenter, "Stress Management"
11/93	Presenter, "Evaluating Student Learning"
11/94	Presenter, "Evaluating Student Learning"
11/95	Presenter, "Evaluating Student Learning"

### Professional Service

#### Refereeing of Journal Articles

1991	<i>Phys. Rev. Lett.</i> - 1, <i>Phys. Lett. B</i> - 1
1992	<i>Phys. Rev. Lett.</i> - 1
1997	<i>Phys. Lett. B</i> - 1
1999	<i>Phys. Rev. Lett.</i> - 1
2000	<i>Phys. Rev. Lett.</i> - 1
2001	<i>Phys. Rev. Lett.</i> - 1
2002	<i>Phys. Rev. Lett.</i> - 4
2003	<i>Phys. Rev. Lett.</i> - 1
2004	<i>Phys. Rev. Lett.</i> - 2
2006	<i>Phys. Rev. Lett.</i> - 1
2007	<i>Phys. Rev. Lett.</i> - 1, <i>Phys. Rev. C</i> - 1
2008	<i>Phys. Rev. Lett.</i> - 1, <i>Phys. Rev. C</i> - 2, <i>Phys. Lett. B</i> - 1
2009	<i>Phys. Rev. Lett.</i> - 1
2011	<i>Phys. Rev. Lett.</i> - 1
2012	<i>Phys. Rev. Lett.</i> - 1
2013	<i>Phys. Rev. Lett.</i> - 1
2014	<i>Phys. Rev. Lett.</i> - 2, <i>Phys. Rev. C</i> - 1
2015	<i>Phys. Rev. Lett.</i> - 1, <i>Phys. Rev. C</i> - 1, <i>Phys. Lett. B</i> - 1
2016	<i>Phys. Rev. Lett.</i> - 1, <i>Phys. Rev. C</i> - 2
2018	<i>Phys. Rev. Lett.</i> - 1, <i>Phys. Lett. B</i> - 1

#### Review of Proposals to Funding Agencies and Laboratories

1994	<i>US Dept of Energy</i> - 1
1995	<i>National Science Foundation</i> - 1
1996	<i>US Dept of Energy</i> - 1
1997	<i>US Dept of Energy</i> - 1, <i>National Science Foundation</i> - 1
1999	<i>US Dept of Energy</i> - 1
2000	<i>US Dept of Energy</i> - 1
2001	<i>US Dept of Energy</i> - 2
2002	<i>US Dept of Energy</i> - 1, <i>National Science Foundation</i> - 1
2003	<i>National Science Foundation</i> - 1

- 2004 *US Dept of Energy - 2, National Science Foundation - 1*
- 2005 *US Dept of Energy - 1, National Science Foundation - 1*
- 2006 *US Dept of Energy Review Panel, National Science Foundation Nuclear Review Panel*
- 2007 *US Dept of Energy - 2, National Science Foundation Nuclear Review Panel (Chair),  
National Science Foundation Site Visit and Review,  
Jefferson Laboratory Program Advisory Committee*
- 2008 *US Dept of Energy - 3, US Dept of Energy Review Panel,  
National Science Foundation - 1,  
Jefferson Laboratory Program Advisory Committee*
- 2009 *National Science Foundation - 1,  
Jefferson Laboratory Program Advisory Committee*
- 2010 *National Science Foundation - 2,  
Jefferson Laboratory Program Advisory Committee*
- 2011 *National Science Foundation - 1*
- 2012 *US Dept of Energy - 2,  
National Science Foundation - 1*
- 2013 *US Dept of Energy - 2,  
National Science Foundation - 1*

### **Conference Organization**

- 1999 *Convenor, Int. Workshop on Physics with Transversely Polarized Targets*
- 2001 *Co-Convenor, Working Group on QCD at Snowmass 2001 Conference*
- 2002 *Organizer, Workshop on Physics with a HERA-III*
- 2003 *Organizer, Workshop on Physics with an Electron-Ion Collider*
- 2004 *Organizing Committee, PANIC 2005 Conference*
- 2004 *Co-Convenor, Spin Physics at DIS 2004 Conference*
- 2005 *Program Committee, 2006 Spring Meeting, American Physical Society*
- 2006 *Co-Convenor, Nucleon Structure at CIPANP 2006 Conference*
- 2006 *Co-Convenor, Nucleon Structure at 3rd Electron-Ion Collider Workshop*
- 2008 *Co-Convenor, Electron-Ion Collider Workshop, Lawrence Berkeley Lab*
- 2010 *Co-Convenor, Int. Deep Inelastic Scattering Workshop (DIS2010), Florence, Italy*
- 2017 *Organizer, Co-convenor, National Nuclear Physics Summer School, Boulder, CO*

19 April 2019