

Lisa J. Kaufman
Curriculum Vitae

Indiana University Department of Physics
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Education

Ph.D. Physics, University of Massachusetts Amherst, February 2007.

Dissertation: Precision Measurement of the Proton Weak Form Factors at $Q^2 \sim 0.1 \text{ GeV}^2$.

Advisor: Prof. Krishna Kumar

M.S. Physics, University of Massachusetts Amherst, May 2002.

B.S. Mathematics and Physics, College of William and Mary, May 2000.

Senior Honors Thesis: Recoil Proton Detection for Radiative Decays of the ϕ Meson, High Honors.

Advisor: Prof. David Armstrong

Research Experience

Assistant Professor: Experimental Nuclear Physics Group

Center for Exploration of Energy and Matter
Department of Physics, Indiana University
August 2010 - present

- Enriched Xenon Observatory (EXO) for Double Beta Decay research group leader studying neutron induced backgrounds for full-EXO and single-ion barium mobility.
- Shift coordinator and run coordinator for EXO-200.

Postdoctoral Research Associate: Experimental Nuclear Physics Group

Department of Physics, University of Maryland

February 2007 - July 2010

- Oversee building, designing, and testing of the EXO-200 gas and liquid cryogenic ultra-high vacuum systems and coordination of EXO priorities remotely and locally.
- Manage EXO operations at the Waste Isolation Pilot Plant (WIPP), including establishing the first science experiment at the mine facility. Coordinate experimental personnel, mine personnel, and work schedules.
- Serve as run coordinator and shift leader for commissioning of liquid xenon cryogenics and control systems of EXO at Stanford University in 2007 and at WIPP in 2009.

- Supervise shipment of the EXO experiment from Stanford, CA to WIPP in Carlsbad, NM and reassembly of EXO at WIPP.
- Construct and test xenon vacuum system for EXO at Stanford University.
- Design and implement EXO event display using C++ and ROOT for real-time and offline analysis.

Research Assistant: Experimental Medium Energy Nuclear Physics Group
 Department of Physics, University of Massachusetts Amherst

September 2002 - December 2006

- Conducted thesis work on the Hall A Proton Parity EXperiment (HAPPEX), E99-115 and E00-114, at Jefferson Lab in Newport News, VA.
- Developed and implemented alignment technique of polarized source optics, especially of Pockels cells, to control helicity-correlated beam fluctuations for the 2004 and 2005 data-taking runs of HAPPEX. As a result of this precision work, the correction to the physics asymmetry due to these fluctuations was negligible.
- Commissioned and qualified new beam cavity monitors and their electronics during the 2005 data run.
- Performed the beam and physics asymmetry analyses of E99-115 in 2004 and for both E99-115 and E00-114 in 2005 using C++ and the ROOT analysis software. Supervised UMass students on data analysis projects in Spring 2005.

July 2000 - 2003

- Designed, built, and installed a lead glass detector to make background measurements for SLAC experiment E158.
- Installed and debugged a motion control system for profile scanners built at UMass.
- Performed the linearity analysis of the ADCs using the ROOT analysis software.

Listed below are all of the experiments for which I have been involved with data-taking.

JLab E02-013	Measurement of the Neutron Electric Form Factor G_E^n at High Q^2 , Spring 2006.
JLab E03-106	Deeply Virtual Compton Scattering on the Neutron, Fall 2004.
JLab E99-115	Constraining the Nucleon Strangeness Radius in Parity-violating Electron Scattering, Summer 2004 and Fall 2005.
JLab E00-114	Parity Violation from ^4He at Low Q^2 : A Clean Measurement of ρ_s , Summer 2004 and Summer 2005.
JLab E94-107	High Resolution Hypernuclear 1p shell Spectroscopy, February 2004.
JLab E97-110	The GDH Sum Rule, the Spin Structure of ^3He and the Neutron using Nearly Real Photons, Spring 2003.
JLab E01-012	Measurement of the Neutron (^3He) Spin Structure Functions in the Resonance Region, December 2002-January 2003.
JLab E00-007	Proton Polarization Angular Distribution in Deuteron Photo-disintegration, Fall 2002.

JLab E01-020	$(e, e'p)$ Studies of the Deuteron at High Q^2 , Fall 2002.
JLab E99-117	Precision Measurement of the Neutron Asymmetry A_1^n at Large x using CEBAF at 6 GeV, Summer 2002.
SLAC E158	A Precision Measurement of the Weak Mixing Angle in Møller Scattering, 2001-2003.

Undergraduate Senior Research 1999-2000

- Analyzed data from experiment E94-016, Radiative Decays of the ϕ Meson, at Jefferson Lab using the the C programming language and PAW++ for improved resolution in detector timing.
- Gained a broad understanding of scintillation detectors and Čerenkov calorimeters.
- Modified the analysis software in order to do recoil proton identification and to correlate these events with final photon states in the calorimeter.

Research Experience for Undergraduates

Department of Physics, College of William and Mary, Williamsburg VA

Summer 1999

- Designed and programmed an event display for a new detector being used in E94-016 at Jefferson Lab in Hall B using a graphics library called Hv, Hot views.
- Conducted online analysis and event reconstruction using the event display.
- Participated in the data-taking for the Summer 1999 engineering run of the experiment.

Summer 1998

- Designed and built a programmable precision timing delay generator for timing of lasers for atomic physics research.
- Programmed a peripheral interface controller (PIC) for use in the circuit.
- Improved the interface between the lab equipment and computers for data acquisition.

Selected Refereed Publications

S. Riordan *et al.*, “**Measurements of the Electric Form Factor of the Neutron at $Q^2 = 3.4 \text{ GeV}^2$ using the Reaction ${}^3\text{He}(e, e'n)\text{pp}$** ”, Phys. Rev. Lett. **105**, 262302 (2010).

M. Montero Díez *et al.*, “**A simple radionuclide-driven single-ion source**”, Rev. Sci. Instrum. **81**, 113301 (2010).

D.S. Leonard, A. Dobi, C. Hall, L.J. Kaufman, T. Langford, S. Slutsky, and Y-R. Yen, “**A simple high-sensitivity technique for purity analysis of xenon gas**”, Nucl. Inst. Meth. A **621**, 678 (2010).

A. Dobi, D.S. Leonard, C. Hall, L.J. Kaufman, T. Langford, S. Slutsky, and Y-R. Yen, **Study of a zirconium getter for purification of xenon gas**, Nucl. Inst. Meth. A **620**, 594 (2010).

S. Slutsky, Y-R. Yen, H. Breuer, A. Dobi, C. Hall, T. Langford, D.S. Leonard, L.J. Kaufman, V. Strickland, and N. Voskanian, **A Xenon Condenser with a Remote Liquid Storage Vessel**, Nucl. Inst. Meth. A **610**, 669 (2009).

R. Neilson *et al.*, **Characterization of large area APDs for the EXO-200 detector**, Nucl. Inst. Meth. A **608**, 68 (2009).

A. Acha *et al.*, **Precision Measurements of the Nucleon Strange Form Factors at $Q^2 \sim 0.1 \text{ GeV}^2$** , Phys. Rev. Lett. **98**, 032301 (2007).

R.T. Jones *et al.*, **Performance of the RADPHI detector and trigger in a high rate tagged photon beam**, Nucl. Inst. Meth. A **570**, 384 (2007).

K.A. Aniol *et al.*, **Constraints on the Nucleon Strange Form Factors at $Q^2 \sim 0.1 \text{ GeV}^2$** , Phys. Lett. **B635**, 275-279 (2006).

K.A. Aniol *et al.*, **Parity-Violating Electron Scattering from ^4He and the Strange Electric Form Factor of the Nucleon**, Phys. Rev. Lett. **96**, 022003 (2006).

P.L. Anthony *et al.*, **Precision Measurement of the Weak Mixing Angle in Møller Scattering**, Phys. Rev. Lett. **95**, 081601 (2005).

P.L. Anthony *et al.*, **Observation of Parity Nonconservation in Møller Scattering**, Phys. Rev. Lett. **92**, 181602 (2004).

Other Refereed Publications

F. Cusanno *et al.*, **High-Resolution Spectroscopy of $^{16}_{\Lambda}\text{N}$ by Electroproduction**, Phys. Rev. Lett. **103**, 202501 (2009).

R. Subedi *et al.*, **Probing Cold Dense Nuclear Matter**, Science **320**, 1476 (2008).

M. Mazouz *et al.*, **Deeply Virtual Compton Scattering off the Neutron**, Phys. Rev. Lett. **99**, 242501 (2007).

M. Iodice *et al.*, **High Resolution Spectroscopy of $^{12}_{\Lambda}\text{B}$ by Electroproduction**, Phys. Rev. Lett. **99**, 052501 (2007).

X. Jiang *et al.*, **Recoil-Proton Polarization in High-Energy Deuteron Photo-disintegration with Circularly Polarized Photons**, Phys. Rev. Lett. **98**, 182302 (2007).

C. Muñoz Camacho *et al.*, “**Scaling Tests of the Cross Section for Deeply Virtual Compton Scattering**”, Phys. Rev. Lett. **97**, 262002 (2006).

R. Shneor *et al.*, “**Investigation of proton-proton short-range correlations via the $^{12}\text{C}(e, e', pp)$ reaction**”, Phys. Rev. Lett. **99**, 072501 (2007).

X. Zheng *et al.*, “**Precision Measurement of the Neutron Spin Asymmetries and Spin-dependent Structure Functions in the Valence Quark Region**”, Phys. Rev. C **70**, 065207 (2004).

X. Zheng *et al.*, “**Precision Measurement of the Neutron Spin Asymmetry A_1^n and Spin-flavor Decomposition in the Valence Quark Region**”, Phys. Rev. Lett. **92**, 012004 (2004).

Conference Proceedings

L.J. Kaufman, “Searching for Double Beta Decay with the Enriched Xenon Observatory”, J. Phys.: Conf. Ser. **203**, 012067 (2010).

L.J. Kaufman, “Transverse beam asymmetries measured from ^4He and hydrogen targets”, Milos, Greece, Eur. Phys. J. A. **32**, 501 (2007).

H. Dong, A. Freyberger, S. Kauffman, L. Kaufman, J. Musson, “Digital Beam Monitor for the HAPPEX Experiment”, Knoxville 2005, Particle Accelerator Conference (2005).

L.J. Kaufman, “SLAC Experiment E158: A Precision Measurement of the Weak Mixing Angle in Møller Scattering”, Proceedings of the 16th and 17th Annual HUGS (2004).

Presentations

“Progress and Future Prospects in Neutrinoless Double Beta Decay”, Double beta decay mini-symposium keynote talk (invited), APS Division of Nuclear Physics Fall Meeting, Santa Fe, NM, November 5, 2010.

“The Search for Neutrino Mass with Xenon in the Salt Beds of New Mexico”, Joseph and Sophia Konopinski Colloquium (invited), Indiana University, Bloomington, IN, September 22, 2010.

“Searching for Neutrino Mass at the sub-eV Scale with the Enriched Xenon Observatory”, Invited seminar, Ohio University, Athens, OH, April 20, 2010.

“A *Miner* Challenge: Measuring Neutrino Mass with the Enriched Xenon Observatory for Double Beta Decay”, Invited seminar/colloquium, Christopher Newport University, Newport News, VA, February 22, 2010.

“A *Miner* Challenge: Searching for Double Beta Decay 2150 ft Underground in New Mexico”, Invited Seminar, Argonne National Laboratory, Argonne, IL, February 8, 2010.

“A *Miner* Challenge: Searching for Double Beta Decay 2150 ft Underground in New Mexico”, Invited seminar, Indiana University, Bloomington, IN, February 2, 2010.

“A *Miner* Challenge: Searching for Double Beta Decay 2150 ft Underground in New Mexico”, Invited seminar/colloquium, Southern Methodist University, Dallas, TX, October 26, 2009.

“Searching for Double Beta Decay with the Enriched Xenon Observatory”, Contributed talk, The Eleventh International Conference on Topics in Astroparticle and Underground Physics (TAUP 2009), Rome, Italy, July 2009.

”Searching for Double Beta Decay with the Enriched Xenon Observatory”, Invited seminar, Lawrence Livermore National Laboratory, Livermore, CA, June 17, 2009.

“Searching for Double Beta Decay with the Enriched Xenon Observatory”, Invited seminar, Cornell University, Ithaca, NY, September 26, 2008.

“Searching for Double Beta Decay with the Enriched Xenon Observatory”, Invited seminar, University of Illinois at Urbana-Champaign, Urbana, IL, September 23, 2008.

“Searching for Double Beta Decay with the Enriched Xenon Observatory”, Invited seminar, Argonne National Laboratory, Argonne, IL, September 22, 2008.

”Searching for Double Beta Decay with the Enriched Xenon Observatory”, Invited seminar, Stanford Linear Accelerator Center, Menlo Park, CA, September 16, 2008.

“How Much Does a Neutrino Weigh?”, Invited talk, The American Nuclear Society Carlsbad Chapter, Carlsbad, NM, December 6, 2007.

“Parity-violating Electron Scattering and Strangeness in the Nucleon: Results from HAPPEX-II”, Invited seminar, University of Wisconsin-Madison, Madison, WI, November 6, 2006.

“Parity-violating Electron Scattering and Strangeness in the Nucleon: Results from HAPPEX-II”, Invited seminar, University of South Carolina, Columbia, SC, October 23, 2006.

“Parity-violating Electron Scattering and Strangeness in the Nucleon: Results from HAPPEX-II”, Invited seminar, California Institute of Technology, Pasadena, CA, October 13, 2006.

“Parity-violating Electron Scattering and Strangeness in the Nucleon: Results from HAPPEX-II”, Invited seminar, Stanford Linear Accelerator Center, Menlo Park, CA, October 10, 2006.

“Parity-violating Electron Scattering and Strangeness in the Nucleon: Results from HAPPEX-II”, Invited seminar, The George Washington University, Washington, DC, September 14, 2006.

“Parity-violating Electron Scattering and Strangeness in the Nucleon: Results from HAPPEX-II”, Invited seminar, University of Maryland, College Park, MD, September 13, 2006.

“Transverse Beam Spin Asymmetries Measured from Helium-4 and Hydrogen Targets”, Invited talk, From Parity Violation to Hadronic Structure and More (Part III) (PAVI06), Milos Island, Greece, May 19, 2006.

“Parity-violating Electron Scattering and Strangeness in the Nucleon”, Nuclear and High Energy Physics Lunch Seminar, University of Massachusetts Amherst, Amherst, MA, May 2, 2006.

“Forward-angle Parity-violating Electron Scattering from the Proton”, Nuclear and High Energy Physics Lunch Seminar, University of Massachusetts Amherst, Amherst, MA, November 16, 2004.

“Forward-angle Parity-violating Electron Scattering from the Proton”, Contributed talk, APS Division of Nuclear Physics Fall Meeting, Chicago, IL, October 29, 2004.

“HAPPEX Status Report”, Hall A Collaboration Meeting, Thomas Jefferson National Accelerator Facility, Newport News, VA, May 17, 2004.

“Control of Helicity-correlated Beam Fluctuations for HAPPEX II at Jefferson Lab”, Contributed poster, Gordon Research Conference for Nuclear Physics, Waterville, ME, July 21, 2003.

Teaching Experience

Spring 2011	Physics P221 Introductory Physics (Calculus-based), Assistant Professor, Indiana University
Fall 2010	Physics P309 Intermediate Modern Physics Laboratory, Assistant Professor, Indiana University
Spring 2002	Physics help desk, teaching assistant, University of Massachusetts Amherst
2001	Physics for life sciences, lab instructor, University of Massachusetts Amherst
Fall 2000	Physics for engineers, lab instructor, University of Massachusetts Amherst

Membership, Service and Outreach

December 2010 - present	SLAC Users Organization (SLUO) Executive Committee member
August 2010 - present	Indiana University Physics Department Outreach Committee member
October 2010 - present	Volunteer as demonstration presenter for local Bloomington elementary school science nights
August 2010 - present	Indiana University Physics Department Search and Screen Committee member
August 2010 - present	Indiana University Physics Department Graduate Recruitment Committee member
August 2010 - present	Indiana University Physics Department Faculty-Student Relations Committee member
June 2004 - present	American Physical Society member
July 2000 - present	SLUO member
June 1999 - present	Jefferson Lab Users Group member
January 2009 - April 2009	Co-chair of the SLUO Washington, DC Trip Subcommittee and representative on the annual trip to Washington, DC to visit congressional offices to discuss science funding in the US
February 2009	Volunteer moderator for the Department of Energy's Regional Science Bowl held at SLAC
March 2008	Representative on the SLUO annual trip to Washington, DC
June 2004 - January 2006	Jefferson Lab Graduate Student Association officer, member since September 2002
July 2004 - January 2006	Jefferson Lab Library Committee member
April 2005	Volunteer for Graduate Student Association table at Jefferson Lab open house
February - March 2005	Volunteer moderator and time-keeper for the Virginia Regional Science Bowl for both high school and middle school events
April 2003	Volunteer Hall A tour guide at Jefferson Lab open house
September 2001 - August 2002	Women's Representative of Physics Graduate Student Association, University of Massachusetts Amherst

Honors and Awards

2000-2002	University of Massachusetts Amherst Physics Department Research Fellowship
1996-2000	IBM Thomas J. Watson Memorial Scholarship