

Sarah K. Phillips

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Citizen of the United States

Experimental Nuclear Physicist

Objective: To obtain a research position that seeks innovative, analytical solutions using experimental physics and where my computer programming, data analysis, and hardware/detector skills are applied to a variety of challenges.

Research Experience

Graduate Research Assistant, Department of Physics, The College of William and Mary, Virginia, Nuclear Physics Group with Dr. David Armstrong and Dr. Allison Lung: July 2000 - present

- Analyzed forward-angle production data from the G^0 parity-violation experiment at Thomas Jefferson National Accelerator Facility and extracted small asymmetries (3 to 40 parts per million) from spin-dependent differences in detectors yields.
- Analyzed the data taken with a transversely-polarized electron beam for G^0 for systematic effects on the longitudinal measurement and as a measurement of the two-photon exchange amplitude; authored publication in Physical Review Letters.
- Designed and programmed the G^0 analysis software as a member of the software development team.
- Worked as a member of the polarimetry group for the G^0 experiment, taking data with the Møller polarimeter and doing the analysis of the beam polarization data.
- Collaborated with the Jefferson Lab Accelerator Division to improve electron beam quality for G^0 .
- Designed, built, installed, commissioned, calibrated, and operated the beam halo background monitoring system for G^0 and analyzed the electron beam halo data.
- Collaborated in the assembly and commissioning of the scintillation detectors for the G^0 experiment.
- Mentored Aimee Slaughter, William and Mary undergraduate 2003-2004; worked with her during the construction and installation of the new beam halo monitoring system for G^0 , and the collection and analysis of beam halo data as part of her honors thesis project.
- Graduate fellow in the RISE program (Research Internships in Science and Engineering) through the University of Maryland, Summer 2002; mentored an undergraduate RISE scholar, Tricia Clore, from the University of Kentucky; designed and built a prototype beam halo monitor for the G^0 experiment.

Undergraduate Research Assistant, Department of Physics and Astronomy, Mississippi State University, Mississippi, Nuclear Physics Group with Dr. Jeff Winger and Dr. Wenchao Ma: June 1997 - May 2000

- Gamma-ray spectroscopy data analysis
- Took shifts, performed target changes, and other tasks for the running of “Lifetimes of Exotic Bands in $^{168,169}\text{Hf}$ ” (Experiment Number GSFMA54) using Gammasphere and the ATLAS accelerator at Argonne National Laboratory in 1999.

Undergraduate Research Assistant, Department of Mathematics and Statistics, Mississippi State University, Mississippi, with Dr. R. Shivaji: August 1998 - May 2000

- Worked on applications of differential equations to physical concepts

Undergraduate Research Assistant, Thomas Jefferson National Accelerator Facility, Newport News, Virginia

- Research Experience for Undergraduates program June 1998 - August 1998: tested the photomultiplier tubes used in the scintillation detectors for the G^0 experiment.

- Undergraduate Student Intern Research Position June 1999 - August 1999: polished and wrapped the arc-shaped scintillators for the G^0 experiment, designed and conducted the attenuation testing on the scintillators to determine the quality of the polishing with two other undergraduates, Bond Hutchinson and David Larson, working under me.

Relevant Skills

- Development of the data analysis software for the G^0 experiment.
- Experienced with the ROOT data analysis package.
- Computer Languages: C, C++, FORTRAN
- Worked with: Linux/Unix, MySQL databases, L^AT_EX document typesetting, Concurrent Versions System (CVS), the Geant4 simulation package, various word processing, presentation, and spreadsheet software for Linux and Windows
- Familiar with photomultiplier tubes, plastic scintillation detectors, Lucite Čerenkov counters, and their NIM/CAMAC trigger and readout electronics.

Education

Ph.D., Physics, November 2007, The College of William and Mary, Williamsburg, Virginia
 Dissertation: *Measurement of the Strange Quark Contribution to the Vector Structure of the Proton*
 Advisors: Dr. David Armstrong and Dr. Allison Lung

M.S., Physics, May 2002, The College of William and Mary, Williamsburg, Virginia

B.S., Physics (major), Mathematics (minor), Honors Program, Summa Cum Laude, May 2000,
 Mississippi State University, Starkville, Mississippi

Honors, Prizes, and Awards

- First-place prize at SURA poster competition - \$1000 prize, June 22, 2005
- Second-place prize at Gordon Conference Poster Session, July 2005
- SURA Fellowship, 2003 - An award of one-half the recipient's stipend for an academic year, plus \$2,000, with an additional \$2,000 travel fund
- Barry S. Goldwater Scholarship, 1999-2000 - An award that covers expenses for tuition, fees, books and room and board, up to a maximum of \$7,500 per year.

Professional Service, Teaching Experience and Public Outreach

2004-2007 Jefferson Lab Graduate Student Association Officers Committee Chairwoman and Social Coordinator: organized events and led the organization of nearly 500 graduate students and post-doctorates.

2005 Quantum Diarist for the World Year of Physics, <http://qd.typepad.com/33/>
 A collection of 36 particle physicists' online diaries following their lives and careers during the World Year of Physics as a public outreach project. <http://interactions.org/quantumdiaries/>

2005 Poster Presenter at William and Mary Physics Department Open House and NMR Magnet Dedication

2005,2007 Jefferson Lab Open House Physics Interpreter for Hall C and Open House Coordinator for the Jefferson Lab Graduate Student Association.

2003 Jefferson Lab Open House Physics Interpreter for Hall C

2000-2001 Teaching Assistant and Grader for Introductory Astronomy Courses

1998-2000 Tutor for physics and mathematics at Mississippi State University

1996-2000 Career Days and Physics Department Open House Events at Mississippi State University, MS

1995-2000 Volunteer Assistant at the Rainwater Observatory and Planetarium, French Camp, MS

Professional Memberships

The American Physical Society (APS), The Division of Nuclear Physics (DNP), The Division of Particles and Fields (DPF), the Jefferson Lab Users Group, and the G^0 collaboration.

Research Publications and Presentations

Publications in Refereed Journals

1. “**Transverse Beam Spin Asymmetries in Forward-Angle Elastic Electron-Proton Scattering**”, D. S. Armstrong *et al.* [G0 Collaboration], Phys. Rev. Lett. **99**, 092301 (2007) [arXiv:0705.1525 (nucl-ex)]
2. “**Precision Measurements of the Nucleon Strange Form Factors at $Q^2 \sim 0.1 \text{ GeV}^2$** ”, A. Acha *et al.* [HAPPEX collaboration], Phys. Rev. Lett. **98**, 032301 (2007) [arXiv:nucl-ex/0609002]
3. “**Strange quark contributions to parity-violating asymmetries in the forward G0 electron proton scattering experiment**”, D. S. Armstrong *et al.* [G0 Collaboration], Phys. Rev. Lett. **95**, 092001 (2005) [arXiv:nucl-ex/0506021]
4. “**Precision measurement of the neutron spin asymmetries and spin-dependent structure functions in the valence quark region**”, X. Zheng *et al.* [Jefferson Lab Hall A Collaboration], Phys. Rev. C **70**, 065207 (2004) [arXiv:nucl-ex/0405006]
5. “**Precision measurement of the neutron spin asymmetry $A(1)(n)$ and spin-flavor decomposition in the valence quark region**”, X. Zheng *et al.* [Jefferson Lab Hall A Collaboration], Phys. Rev. Lett. **92**, 012004 (2004) [arXiv:nucl-ex/0308011]

Internal Technical Notes and Reports

1. Sarah K. Phillips *et al.* “*Transverse Beam Spin Asymmetries in the G^0 Forward-Angle Measurement*”, G0 Internal Technical Document G0-doc-674-v1, October 2006.
2. Sarah K. Phillips *et al.* “*Møller Polarimetry in the G^0 Experiment*”, G0 Internal Technical Document G0-doc-614-v1, May 2004.
3. Sarah K. Phillips. “*Finding the True Electron Beam Helicity for the G^0 Experiment Using the Hall C Møller Polarimeter*”, G0 Internal Technical Document G0-doc-616-v1, November 2004.
4. Sarah K. Phillips. “*Beam Halo in the First G^0 Engineering Run*”, G0 Internal Technical Document G0-03-106, October 2003.
5. J. Roche *et al.* “*Tests of the G^0 North American Focal Plane Detector*”, G0 Internal Technical Document G0-02-071, August 2002.

Professional Presentations and Posters

1. “*Measurement of Strange Quark Contributions to Nucleon Structure via Parity-Violating Electron Scattering*”, Physics colloquium at Mississippi State University, Starkville, MS, February 15, 2007
2. “*Transverse Beam Spin Asymmetries from the G^0 Experiment*”, Presentation for the January 2007 Hall C Users Meeting, Jefferson Lab, Newport News, VA, January 25, 2007
3. “*Transverse Beam Spin Asymmetries from the G^0 Forward-Angle Measurement*”, Presentation for the 2006 Meeting of the APS Division of Nuclear Physics, Gaylord Opryland Conference Center, Nashville, TN, October 28, 2006
4. “*Transverse Beam Spin Asymmetry Results from the G^0 Forward-Angle Measurement*”, Presentation of the new transverse beam spin asymmetry physics results to the Hall C scientists, Jefferson Lab, Newport News, VA, October 23, 2006
5. “*Strangeness in the Proton: The G^0 Forward-Angle Measurement*”, Poster presentation for the College of William and Mary Annual Graduate Research Symposium, Williamsburg, Virginia, March 24 and 25, 2006
6. “*A Measurement of the Two-Photon Exchange Amplitude Using e - p Scattering During the G^0 Experiment*”, Poster presentation for the Gordon Research Conference on Nuclear Physics, Lewiston, Maine, July 10 - 15, 2005

7. *"Strangeness in the Proton: The G^0 Forward-Angle Measurement"*, Poster presentation for the Jefferson Lab Users Group Annual Meeting, Jefferson Lab, Newport News, Virginia, June 20-22, 2005
8. *"The G^0 Experiment: Forward Angle Measurement"*, Presentation for the APS April Meeting, Denver, Colorado, May 1-4, 2004
9. *"Strange Quarks and the G^0 Experiment at Jefferson Lab"*, Presentation for the College of William and Mary Annual Graduate Research Symposium, February 13, 2004
10. *"Beam Halo in Hall C"*, Presentation for the Jefferson Lab Accelerator Beam Transport Team, February 3, 2004
11. *"Monitoring Beam Quality for the G^0 Experiment at Jefferson Lab"*, Presentation for the College of William and Mary Annual Graduate Research Symposium, February 7 - 8, 2003
12. *"Detector Studies for the G^0 Experiment"*, Poster presentation for the Jefferson Lab Science and Technology Review, July 2002
13. *"Detector Testing for the Jefferson Laboratory G^0 Experiment"*, Presentation to the Mississippi Academy of Sciences during their annual meeting, February 2000
14. *"Detector Construction and Testing for the G^0 Experiment at Jefferson Lab"*, Poster presentation for the Division of Nuclear Physics Annual Meeting, Asilomar Conference Center, Pacific Grove, CA, October 20 - 24, 1999

General Audience Presentations

1. *"JLab's Hall C, the G^0 Experiment, and the Impact of JLab in Training Future Generations of Researchers"*, Presentation to Jeff Prunell, JSA board member and Vice President for Finance for CSC Applied Technologies, and Joseph Scarcello, Vice President for Contract Administration for CSC Applied Technologies, May 31, 2006
2. *"The G^0 Experiment: The Forward Angle Measurement and Analysis"*, Presentation for the Graduate Student Pizza Seminar at Jefferson Lab, April 27, 2005
3. *"The G^0 Experiment in Hall C at Jefferson Lab"*, Presentation to the William and Mary Graduate Studies Advisory Board, November 15, 2004
4. *"The G^0 Experiment in Jefferson Lab's Hall C"*, Presentation to Virginia Secretary of Education Belle Wheelan and Deputy Secretary Peter Blake, September 30, 2004
5. *"The G^0 Experiment in Jefferson Lab's Hall C"*, Presentation to Phil Hamilton, Virginia House of Delegates, 93th District, September 22, 2004
6. *"The G^0 Experiment"*, Presentation about Hall C, G^0 and my research to Senator John Warner (R-VA) and Kyle McSlarrow, Deputy Secretary of Energy, April 19, 2004
7. *"Testing the Photomultiplier Tubes for the G^0 Experiment at Jefferson Lab"*, Presentation for the National Honors Convention, Chicago, November 1998

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– Reference letters available upon request –