

CURRICULUM VITAE  
Sarah K. Phillips

November 15, 2007

## Personal Information

### WORK ADDRESS

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Position: Graduate Research Assistant

## Education

Ph.D., Physics, November 2007, The College of William and Mary, Williamsburg, Virginia

- Doctoral 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, Summa Cum Laude, May 2000, Mississippi State University, Starkville, Mississippi

## Honors, Prizes, and Awards

1. First-place prize at SURA poster competition - \$1000 prize, June 22, 2005
2. Second-place prize at Gordon Conference Poster Session July 2005
3. 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
4. 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.

## Academic Experience

### Teaching Experience

1. Teaching Assistant, Physics 177 Introductory Astronomy Labs, Fall 2000 and Spring 2001
2. Grader, Physics 176 Introductory Astronomy, Fall 2001
3. Tutor for Physics Department at Mississippi State University, Fall 1998 - Spring 2000
4. Tutor for Department of Mathematics at Mississippi State University, Fall 1998 - Spring 2000

## Students Mentored

I have mentored several undergraduate students as a graduate assistant with their faculty advisors.

1. Aimee Slaughter, William and Mary undergraduate, September 2003 - May 2004
  - Worked with her during the construction and installation of the new beam halo monitoring system for  $G^0$ , and to collect beam halo data and analyze it as part of her honors thesis project
2. 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.
3. Bond Hutchinson and David Larson, Summer 1999
  - Worked with them to design and perform tests to determine the quality of scintillator polishing.

## 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.
- Worked as a member of the software development team for the  $G^0$  analysis software.
- 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 the  $G^0$  experiment.
- Designed, built, installed, commissioned, 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 to collect beam halo data and analyze it 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
- 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.

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

- Applications of Differential Equations to Physical Concepts

Thomas Jefferson National Accelerator Facility, Newport News, Virginia

- REU program June 1998 - August 1998: tested the photomultiplier tubes used in the scintillation detectors for the G<sup>0</sup> experiment.
- Undergraduate Student Intern Research Position June 1999 - August 1999: polished and wrapped the arc-shaped scintillators for the G<sup>0</sup> experiment, conducted the attenuation testing on the scintillators with two other undergraduates working under me. We also designed and performed radial variation tests.

## Relevant Skills

- Development of the data analysis software for the G<sup>0</sup> experiment.
- Experienced with the ROOT data analysis package.
- Computer Languages: C, C++, FORTRAN
- Worked with: Linux/Unix, MySQL databases, L<sup>A</sup>T<sub>E</sub>X 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 Cherenkov counters, and their NIM/CAMAC trigger and readout electronics.

## Research Publications and Presentations

### Publications

#### 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.

## Presentations

### 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, Tennessee, 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, Virginia, 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 McSarrow, Deputy Secretary of Energy, April 19, 2004
7. *“Testing the Photomultiplier Tubes for the  $G^0$  Experiment at Jefferson Lab”*, Presentation at the National Honors Convention, Chicago, November 1998

## Professional Service

### Memberships

1. Member of the American Physical Society (APS), 2004 - present
2. Member of the Division of Nuclear Physics (DNP), 2004 - present
3. Member of the Division of Particles and Fields (DPF), 2004 - present
4. Member of the  $G^0$  collaboration, 2000 - present
5. Member of the Jefferson Lab Users Group, 2000 - present

### Committees

1. Jefferson Lab Graduate Student Association
  - GSA Officers Committee Chairwoman, Summer 2004 - present; organized events and led the organization of nearly 500 graduate students and post-doctorates.
  - Social Coordinator, Summer 2004 - present
  - Orchestrated with conference organizers to send groups of JLab graduate students and post-doctorates to the APS March Meeting Job Fair, Baltimore, MD, March 13, 2006 and the Nuclear Physics Gordon Research Conference, Newport, RI, July 15-20, 2007.
2. Served as Student Representative on committee for the hiring of a new Provost for Mississippi State University, Fall 1999 - Winter 2000

## Public Outreach

1. Quantum Diaries for the World Year of Physics, March 2005 - December 2005
  - A collection of 36 online diaries by particle physicists following their lives and careers during the World Year of Physics as a public outreach project: <http://interactions.org/quantumdiaries/>
  - My diary: <http://qd.typepad.com/33/>
2. Jefferson Lab Open House Volunteer for Hall C, April 2003, April 2005 and April 2007
3. Jefferson Lab Open House Volunteer and Coordinator for the Graduate Student Association, April 2005 and April 2007
4. Presented and discussed poster for visitors at the William and Mary Physics Department Open House and NMR Magnet Dedication, September 2005
5. Career Days and Physics Department Open House Events at Mississippi State University, MS, August 1996 - May 2000
  - Played the person who would lie down on a bed of sharp nails and allow her advisor to place a cement block on her chest and smash it with a sledge hammer several times a day as part of the physics demonstrations show for visitors.
  - Performed and explained many other compelling and educational physics demonstrations for the public as an education and recruitment tool.
6. Volunteer Assistant at the Rainwater Observatory and Planetarium, French Camp, MS, March 1995 - May 2000
  - Care and maintenance of the observatory telescopes and cameras, library, and collections of meteorites
  - Night sky photography for the observatory
  - Conducting tours for visitors and working with groups at night viewings and at our Mid-South Star Gaze, a convention of amateur astronomers.

## References

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