

Sarah M. Cousineau

Group Leader: Accelerator Physics, Beam Instrumentation and Experimental Techniques, and Ion Source at the Spallation Neutron Source Project
Joint Faculty: University of Tennessee and ORNL

Spallation Neutron Source
PO Box 2008, MS 6461
Oak Ridge, TN 37831-6461

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scousine@ornl.gov

Current Job Responsibilities:

- Manage the Accelerator Physics, Beam Instrumentation and Experimental Techniques, and Ion Source (APBIIS) group at the Spallation Neutron Source.
Primary job responsibilities:
 - Intellectual leadership of accelerator performance; enhancing understanding high power H⁻ linear accelerators and proton accumulator rings;
 - Guiding and facilitating efforts in accelerator physics, beam instrumentation, ion source R&D, strategic plans for accelerator performance improvements, and software tools for efficient modeling and analysis of the beam.
 - Interfacing with other technical groups in the division, and managing the group budget.
 - Enforcing and enhancing a strong culture of safety.
- Serve as principle investigator on grant-funded projects in collaboration with UT through UT/ORNL Joint Faculty appointment.
- Advise graduate and undergraduate students.
- Participate in outreach and professional and community service roles.

Research Interests

- Collective effects in high intensity beams, space charge and instabilities.
- Novel injection methods for proton drivers.
- Code development and benchmarking.
- Novel beam diagnostics.
- High power beam collimation.

Grants:

- “Laser Stripping for High Intensity Synchrotrons”, DOE HEP, **2013, 2016**.
- “Six Dimensional Experimental Characterization of High Intensity Hadron Beams in Front End Systems”, NSF, **2015**.

Education:

- 2003 Ph.D. (Accelerator Physics), Indiana University
- 2000 M.S. (Accelerator Physics), Indiana University

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- 1998 B.S. (Summa Cum Laude, Physics), University of North Dakota

Professional Experience:

02/2012 – present	Joint Faculty Assistant Professor, Department of Physics and Astronomy, University of Tennessee.
01/2016 – present	Group Leader, Accelerator Physics, Beam Instrumentation and Experimental Techniques, and Ion Source group at the Spallation Neutron Source
01/2005 – 03/2016	R&D Staff, Accelerator Physics Group, Spallation Neutron Source.
01/2003 – 01/2003	Postdoctoral Scientist, Accelerator Physics Group, Spallation Neutron Source.
05/1999 – 02/2003	Graduate Research Associate, Indiana University Cyclotron Facility <i>(Understanding Space Charge and Controlling Beam Loss in High Intensity Synchrotrons)</i>
08/1998 – 05/1999	Graduate Associate Instructor Department of Physics, Indiana University
08/1996 – 08/1998	Research Assistant, Department of Physics, University of North Dakota <i>(Optical and X-ray Analysis of Isolated Galaxy Pairs)</i>
06/1997 – 08/1997	Research Assistant, Department of Space Sciences, Cornell University
08/1995 – 06/1998	Teaching Assistant, Physics and Astronomy University of North Dakota

Honors and Awards:

- DOE Women @ Energy: <https://energy.gov/diversity/articles/women-energy-sarah-cousineau>
- ORNL Director's Award for Outstanding Student Mentor, 2015.
- Mentor Excellence Award, U.S. Department of Energy Office of Science Undergraduate Research Activities, 2003 and 2008.
- Women in Science Fellowship Recipient, 1998 – 2002.
- Indiana University Department of Physics Teaching Excellence Recognition Award, 1999.

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- ORNL Significant Event Award for “Demonstration of Microsecond H- Laser-Assisted Stripping”, 2017

Professional Conference, Workshop, and Society Activities

2017 – present	International Organizing Committee, ICFA High Intensity High Brightness Hadron Beam Workshop Series
2016 – present	US Particle Accelerator School (USPAS) Advisory Council
2015 – present	Committee Chair, USPAS Curriculum Committee
2015 – present	APS DPB Education and Outreach Committee
2012 – present	International Organizing Committee, International Computational Accelerator Physics Conference.
2004 – present	Instructor, “Fundamentals of Accelerator Physics” U.S. Particle Accelerator School (2007, 2011, 2014, 2017)
2017, 2016, 2015	IPAC Scientific Advisory Board
2013 – 2016	Editorial Board Member, Physical Review Accelerators and Beams (PRAB)
2015	USPAS Prize Committee
2010 – 2013	Executive Committee Member At Large, American Physical Society Division of Particles and Beams
2006 - present	Member, American Physical Society Division of Beams

Reviews and Panels

- NSF Comparative Review Panel (Internal reviewer)
- Thomas Jefferson National Accelerator Laboratory Biennial S&T Review (2017)
- Management Advisory Committee, PIP-II Project

Outreach Activities

2017 – present	Member, Organizing Committee, ORNL Women in Neutron Science group
2017	MCIDS STEM High School 2017 Annual Harbison Lecturer

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2009, 2010	Instructor, "SNS to the Classroom", an ORISE workshop high school teachers
2007 – 2008	Vice-President, Committee for Women, Oak Ridge National Laboratory
2005 – 2008	Member, Committee for Women, Oak Ridge National Laboratory
2006 - present	Oak Ridge Associated Universities student mentor and SULI program lecturer
2006 - 2009	Annual Tennessee High School Science Bowl volunteer
2006 - 2009	Annual ORNL Day of Science student panel chair
2005	"Einstein in the City" high school science fair organizer, 2005 Particle Accelerator Conference

Refereed Publications and DOE Highlights:

1. **S. Cousineau** et al., *First Demonstration of Laser-Assisted Charge Exchange for Microsecond Duration H- Beams*, Phys. Rev. Lett., **118**, 078401 (2017)
2. **S. Cousineau** et al., "Laser Stripping Powers Protons", DOE HEP Highlight, <https://science.energy.gov/hep/highlights/2017/hep-2017-07-a/>
3. Y. Liu, A. Rakhman, A. Menshov, A. Webster, T. Gorlov, A. Aleksandrov, and **S. Cousineau**, Nuclear Instruments and Methods A, 857, p 171 (2017)
4. S. Henderson et al., *The Spallation Neutron Source Accelerator System Design*, NIM A 763 (2014)
5. J.A. Holmes, **S. Cousineau**, V. Danilov, L. Jain, *Comparison Between Measurements, Simulations, and Theoretical Predictions of the Extraction Kicker Transverse Dipole Instability in the Spallation Neutron Source*, Phys. Rev. ST Accel. Beams, **14**, 074401 (2011)
6. **S. Cousineau**, J.A. Holmes, M. A. Plum, W. Lu, *Dynamics of Uncaught Foil-Stripped Electrons in the Spallation Neutron Source Accumulator Ring*, Phys. Rev. ST Accel. Beams, **14**, 064001 (2011).
7. M. Plum, **S. Cousineau**, J. Galambos, S.H. Kim, P. Ladd, C.F. Luck, C.C. Peters, Y. Polsky, R. W. Shaw, R. J. Macek, and D. Raparia, *Stripper Foil Failure Modes and Cures at the Oak Ridge Spallation Neutron Source*, Phys. Rev. ST Accel. Beams, **14**, 030101 (2011)
8. T. Pelaia and **S. Cousineau**, *A Method for Probing Machine Optics By Constructing Transverse Real Space Beam Distributions Using Beam Position Monitors*, Nucl. Instr. and Methods A, accepted (2008)

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9. D. Jeon, J. Stovall, H. Takeda, S. Nath, J. Billen, L. Young, I. Kisselev, A. Shishlo, A. Aleksandrov, S. Assadi, C.M. Chu, S. Cousineau, V. Danilov, J. Galambos, S. Henderson, S. Kim, L. Kravchuk, E. Tanke, *Acceptance Scan Technique for the Drift Tube Linac of the Spallation Neutron Source*, Nucl. Instr. and Methods A, **570** (2), p. 297 (2006)
10. **S. Cousineau**, *Space Charge and High Intensity Beam Issues in the Design and Commissioning of the Spallation Neutron Source Accelerator*, Nucl. Instr. and Methods A, **561** (2), p. 187 (2007)
11. **S. Cousineau**, V. Danilov, J. Holmes, R. Macek, *Space-Charge-Sustained Microbunch Structure in the Los Alamos Proton Storage Ring*, Phys. Rev. ST Accel. Beams, **7**, 094201 (2004)
12. V. Danilov, **S. Cousineau**, J. Holmes, S. Henderson, *Self-Consistent Time Dependent Two Dimensional and Three Dimensional Space Charge Distributions with Linear Force*, Phys. Rev. ST Accel. Beams **6**, 094202 (2003)
13. **S. Cousineau**, V. Danilov, A. Fedotov, J. Holmes, S.Y. Lee, *Studies of Resonant Beam Behavior in the Proton Storage Ring*, Phys. Rev. ST Accel. Beams **6**, 074202 (2003)
14. **S. Cousineau**, A. Fedotov, J. Holmes, J. Galambos, R. Macek, J. Wei, *Space Charge Induced Resonance Excitation in High Intensity Rings*, Phys. Rev. ST Accel. Beams **6**, 034205 (2003)
15. M. Henriksen and **S. Cousineau**, *An X-ray Survey of Galaxies in Pairs*, Astrophysical Journal **511**, 595 (1999)
16. **S. Cousineau**, *Constructing a Celestial Calendar Wheel*, The Physics Teacher **37**, 477 (1999)

Selected Invited Talks and Seminars:

- “A Hitchhikers Guide to Accelerators and Life as an Accelerator Physicist,” Annual Harbison Lecture, MICDS (St. Louis, 2017)
- “Laser Stripping: A Novel Method for Achieving High Density Beams in Future Accelerators,” opening plenary, Conference for Undergraduate Women in Physics (Norfolk, 2016)
- “High Power Proton Facilities: Operational Experience, Challenges, and the Future”, closing plenary, International Particle Accelerator Conference (Richmond, 2015)
- “The Spallation Neutron Source: A Hitchhikers’ Guide”, Nuclear Group seminar (University of Kentucky, 2015)

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- “Preparations for a 10 us Laser Stripping Demonstration”, 2014 International Particle Accelerator Conference (Dresden, 2014)
- “Beam Physics Challenges at the Spallation Neutron Source Accelerator”, Department of Physics and Astronomy Colloquium, University of Tennessee, (Knoxville, 2012)
- “Status of High Intensity Effects in the Spallation Neutron Source Accumulator Ring”, 2011 Particle Accelerator Conference (New York, 2011)
- “Instability Observations in the Spallation Neutron Source Accumulator Ring”, ICFA Workshop for High Intensity, High Brightness Beams (Nashville, 2008).
- “Experimental Observations and Simulations of Electron-Proton Instabilities in the Spallation Neutron Source Accumulator Ring”, ICFA Workshop on Electron Clouds (S. Korea, 2007)
- “Accumulation of High Intensity Beam and First Observations of Instabilities in the SNS Accumulator Ring”, ICFA Workshop for High Intensity, High Brightness Beams (Japan, 2006)
- “Benchmark of Space Charge Simulations and Comparison with Experimental Results for High Intensity, Low Energy Accelerators,” Particle Accelerator Conference (Knoxville, 2005)
- “Accelerator Physics Challenges in the Spallation Neutron Source Accumulator Ring”, Seminar at the Advanced Photon Source (Argonne, 2005).
- “Simulation Tools for High Intensity Rings,” Particle Accelerator Conference (Portland, 2003)