Dr. Greg Severn

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Education

- Ph.D. ('87) Physics, University of Wisconsin, Madison.
- M.S. ('82) Physics, University of Wisconsin, Madison.
- B.S. ('79) Physics, University of California, Los Angeles. Elected to ΣΠΣ, '79, National Physics Honor Society

Appointments

- Honorary Research Fellow, College of Engineering, Dept. of Engineering Physics, University of Wisconsin-Madison, 2006-
- Appointed Physics Program Director, 2003-2006, Dept. Chair, 2006-
- Professor of Physics, University of San Diego, 1994 to present
- Visiting Professor of Engineering Physics, University of Wisconsin, Madison, 2001
- Visiting Research Scientist, University of California, San Diego, 1993-1994
- Associate Professor of Physics, University of San Diego, 1991-1994
- Assistant Professor of Physics, University of San Diego, 1987-1991

Extramural Research Grants Awarded

9. National Science Foundation, PHY-1206421, *Collaborative Research: Ion Losses to Plasma Boundaries-Sheaths and Presheaths* 2012-2015 $ 165,000; My third renewal! Our work has been productive with many important questions still to address!
8. National Science Foundation, CBET-0903832, *Collaborative Research: Understanding of Presheaths and Sheaths in Plasmas*, 2009-2012 $ 175,000; I can't believe that my grant has been renewed twice now. I am so grateful for the opportunity to continue the work.
7. National Science Foundation, S-STEM Grant for undergraduate scholarships, DUE-0965940, *Attracting students to Computer Science, Mathematics and Physics at USD*, $ 597,774. Although I am not one of the named PI's on the grant, that is something of an accident of circumstances (with exception of Lukasz, we all thought it best to name the youngest members as the PI's). However, I was a participant in the proposal preparation and now in the administration of the grant.
6. US Department of Energy, DOE DE FG02-03ER54728, *Collaborative Understanding presheaths and sheaths in plasmas* 2006-2009 $135,000; I am really, really excited that my grant (item 3) with the DOE was renewed. These grants are extremely competitive, less than 30% rate, and the pool included all major research universities in the US.

5. National Science Foundation, CHE0321326, *MRI/RUI: Acquisition of Laser Instrumentation for Undergraduate Research and Teaching*, $ 198,000, Co-PI with Dr. Jim Bolender (Chemistry), and Dr. Michel Boudrias (MARS). I was the only one of the PI's who had peer-reviewed publications to report that were (in part) supported by the grant.

4. US Department of Energy, DOE DE FG02-03ER54728, *Collaborative Understanding presheaths and sheaths in plasmas* 2003-2006, $165,000

3. National Science Foundation, PHY-9722658, Research in Undergraduate Institutions (RUI), *Experimental Studies in Chaotic Dynamics and Transport in plasmas using Laser-Induced Fluorescence* 1997-2000, $ 131,000; this was the first research grant in the Physics Department to bring indirect costs back to the University. Until this past year, I was the only faculty member in physics to have done so with this grant as well as with items 4, 5, and 6.

2. The Research Corporation, CC4358, *Experimental Studies of Chaotic Dynamics using LIF in plasmas* 1996-1998, $ 29,285

1. National Science Foundation, USE9052344, Instrumentation and Laboratory Improvement Grant, 1990-1993 *Vacuum Apparatus for Study of Vacuum Technology and Plasma Physics*; this grant served to create the Physics Department's first upper division experimental physics course.

Synergistic Activities

- Teaching innovations: My background in (and enjoyment of!) diagnostic development led me to think of new ways diode lasers could be used to try old experiments. One of my undergraduate research students and I worked on a project involving Ruchardt's method for measuring the ratio of specific heats of air. Our paper was published in the American Journal of Physics. Presently, our funded work has led to the inclusion of new experiments in our upper division experimental physics course (PHYSICS 480W, Experimental Modern Physics), one of which was an ion acoustic waves experiment in a two ion species plasma. Undergraduates get the feel of doing experiments at current forefront of research in plasma physics. I have submitted a paper about the physics of the plasma sheath to the American Journal of Physics, and in this way I have reached the general physics teaching community with news of research in plasma physics, an underrepresented subject in that important journal for physics teachers. Member American Association of Physics Teachers, 1987-2002, 2006-

- Creation of Research tools: I participated in the work of searching for LIF schemes in ArII suitable accessible by diode lasers. I collaborated with Roger McWilliams group at UCI and helped field the first diode laser based LIF instrument for use in plasma physics. I wrote the paper describing our work in the Reviews of Scientific Instruments. Our work has been influential in the plasma physics community; many researchers now use diode laser based LIF and many cite our paper. Member American Physical Society. I have been sought out as a consultant on the implementation of diode laser systems by research groups at West Virginia University, University of Wisconsin-Madison, and KAIST, Daejeong, Republic of Korea.

- Service to science and engineering communities: I have participated in local and national AAPT conferences, both in presenting posters and giving talks and in helping to organize special sessions. I am a referee or reviewer for the following peer reviewed journals, and publishing houses:

1. Physics of Plasmas[1], the main archival journal for the discipline of plasma physics in the United States.
2. Journal of Applied Physics,
3. IEEE Transactions on Plasma Science,
4. American Journal of Physics[2]
5. Plasma Sources, Science and Technology[3]
6. National Science Foundation (MRI Grant reviewer)
7. U.S. Dept. of Energy; I recently served as a reviewer for Fusion energy research proposal, and for the particular program for which I serve (Fusion Plasma Diagnostics), I am the only reviewer from a principally undergraduate institution-the rest are from either major research universities or from U.S. National laboratories.
8. Thomson, Brooks-Cole; I have served as a reviewer (chapter reviewer for 3rd Ed. and chapter reviewer and final copy reviewer for 4th Ed.) for *Principles of Physics*, Serway & Jewett, one of the most popular texts in the U.S. for courses like our General Physics courses, and a text which USD has adopted since I began reviewing for the them.

Collaborations

- The USD-UW-Madison collaboration between Dr. Hershkowitz and myself has recently led to several papers (e.g., Phys. Rev. Lett. and Journal of Solid Thin Films), conference papers (e.g. at the American Physical Society (APS)[4] topical conferences of the Division of Plasma Physics and the Gaseous Electronics Conference, which is the oldest topical meeting of the APS), and invited talks (e.g., the 7th Asian and Pacific Conference on Plasma Science and Technology, Fukuaka, Japan, July 1, 2004, and the Plasma Physics Seminar at the University of Colorado-Boulder, 1 Oct. 2007).

- There is an interdisciplinary research and curricular collaboration between Chemistry, Physics, and Marine Studies, the first of its kind at USD, one that was wholly inspired by the planning for the then new Shiley Center for Science and Technology which issued in the NSF MRI grant (item # 5 above in the Extramural Grants category), which brought $ 198,000 to USD to outfit a laboratory and a new upper division honors course in Laser Spectroscopy to USD. Dr. Bolender is the Chemistry PI, I am the Physics Co-PI, and Dr. Michel Boudrias is the Marine Studies Co-PI.

Peer Reviewed Physics Journals

18. *Comment on "Ar + and Xe + Velocities near the Presheath-Sheath Boundary in an Ar/Xe Discharge"*, Hershkowitz, N., Severn, G.D., Baalrud, S.D., Hegna, C.C., Callen, J.D., Physical Review Letters **108**, 139501 (2012).
17. *A note on the gyromagnetic properties of the hydrogens*, G.D. Severn, and J.P. Bolender, submitted to the American Journal of Physics, preliminary acceptance came in December 2012, in process of revision
16. *Experimental test of instability enhanced collisional friction for determining ion loss in two ion species plasmas,* N. Hershkowitz, C.-S. Yip, and G. D. Severn, Phys. Plasmas **18**, 057102 (2011).

[1]Published by the American Institute of Physics (AIP), College Park MD, 20740-3845
[2]Published by the American Association of Physics Teachers, member society of AIP, College Park, MD 20740-3845
[3]Published by the Institute of Physics, Bristol, England
[4]Member society of the AIP

15. *Experimental Test of Instability-Enhanced Collisional Friction for Determining Ion Loss in Two Ion Species Plasmas*, C.-S. Yip, Noah Hershkowitz, and Greg Severn, Phys. Rev. Lett. **104**, 225003 (2010)

14. *Experimental studies of transverse metastable ion velocity distribution functions in the presheath of a weakly collisional argon plasma,* Dongsoo Lee, Noah Hershkowitz, and Greg Severn, Phys. Plasmas 15, 083503 (2008)

13. *Xenon ion laser-induced fluorescence using a visible tunable diode laser near 680nm*, Greg Severn, Dongsoo Lee, and Noah Hershkowitz, Review of Scientific Instruments, **78** 116105 NOV (2007)

12. *Measurements of Ar^+ and Xe^+ velocities near the sheath boundary of Ar-Xe plasma using two diode lasers*, Dongsoo Lee, Noah Hershkowitz, and Greg Severn, Applied Physics Letters, v 91, n 4, p 041505, 2007.

11. *A note on the plasma sheath and the Bohm Criterion*, G.D. Severn, Am. J. Phys. 75, 92 (2007)

10. *Laser-induced fluorescence measurements of argon ion velocities near the sheath boundary of an argon-xenon plasma*, Dongsoo Lee, G.D. Severn, L. Oksuz, and Noah Hershkowitz, Journal of Physics D: Applied Physics, v 39, n 24, Dec 21, p 5230-5235, 2006

9. *Ion flow and sheath physics studies in multiple ion species plasmas using diode laser based laser-induced fluorescence*, G. D. Severn, Xu Wang, N. Hershkowitz, M.Turner, R. McWilliams, Solid Thin Films, **506,507**, p.674-678, 2006

8. *Experimental studies of the Bohm Criterion in a two ion species plasma using laser induced fluorescence*, G.D. Severn, Xu Wang, Eunsuk Ko, and N.Hershkowitz, Physical Review Letters, April 11, volume 90, No.14 (145000), 2003

7. *A simple extension of Ruchardt's method for measuring the ratio of specific heats of air using microcomputer based laboratory sensors*, G.D. Severn and T. Steffensen[5], American Journal of Physics, **69**, 387, (2001)

6. Argon ion laser-induced fluorescence with diode lasers, G.D. Severn, D.A. Edrich, and R. McWilliams, Rev. Sci. Instrum. **69** 10 (1998)

5. *Radial control of the electrostatic potential in a tandem mirror with quadrupole end cells*, G.D. Severn, N. Hershkowitz, Phys. Fluids B, **4**, 3210 (1992)

4. *Experimental studies of the rotational stability of a tandem mirror with quadrupole end cells*, G.D. Severn, N. Hershkowitz, R.A. Breun, and J.R. Ferron, Phys. Fluids B, **3**, 114 (1991)

3. *Electrostatic End Plugging Accompanied by a Central-Cell Density Increase in an Axisymmetric Tandem Mirror*, J.R. Ferron, R. Goulding, B.A. Nelson, T. Intrator, En Yao Wang, G. Severn, N. Hershkowitz, D. Brouchous, J. Pew, R.A. Breun, R. Majeski, Phys. Fluids **30**, 2855 (1987)

2. *Application of Secondary Emission-Capacitive Probes for plasma potential measurements in plasmas with hot electrons* En Yao Wang, N. Hershkowitz, D. Diebold, T. Intrator, R. Majeski, H. Persing, G. Severn, and B. Nelson, J. Appl. Phys. **61**, 4786 (1987)

1. *Stabilization of MHD modes in an axisymmetric magnetic mirror by applied RF waves and initial results of Phaedrus-B*, Breun, R.A. (Dept. of Nucl. Eng., Wisconsin Univ., Madison, WI, USA), Brooker, P.; Brouchous, D., Browning, J., Butz, G., Conrad, J., Dales, E., Ferron, J., Goulding, R., Hershkowitz, N., Intrator, T., Litwin, C., Majeski, R., Meassick, S., Nelson, B., Peranich, L., Persing, H., Radtke, J., Roberts, D., Severn, G., Sing, D., Wang, E., D'Ippolito, D.A., Myra, J.R., Francis, G.L., Nuclear Fusion Supplement, v 2, p 263-71, (1987)

Invited Talks

18. *John Henry Newman, a new star rising in the west*, Graduate Christian Fellowship, UCSD, Jan.4, 2011

17. *Plasma physics from fusion to plasma processing: cool ideas in the physics of hot stuff*, Spring meeting of the Southern California American Association of Physics Teachers Meeting, Nov.14 2009

[5]undergraduate student author

16. *An experimental study of what happens to ions at the plasma boundary in multiple-ion species plasmas: how diode lasers help illumine the problem of sheath formation*, Plasma Physics Seminar (Plasma Theory and Simulation Group), University of California, Berkeley, 22 June, 2009.
15. *What happens to ions at the plasma boundary in multiple-ion species plasmas? How diode lasers help illumine the problem of sheath formation*, Plasma Physics Seminar at UC Irvine, 27 May 2009
14. *The Quantum Mechanics of Belief, being a consideration of 4 Models of relating Science to Faith*, Graduate Christian Fellowship, UCSD, Nov. 20, 2008
13. *Is the Bohm Criterion satisfied in multiple ion species plasmas? Adventures with fluorescence (LIF) and Extremum Principles*, National Center for Plasma Science and Technology, Dublin City University, Dublin, Ireland, Jan.18, 2008
12. *Experiments in Science and Faith: to what extent are scientific experiments possible in the realm of Faith, and does Scripture furnish examples either by precept or described experience?* Graduate Christian Fellowship, UCSD, Oct. 18, 2007
11. *Is the Bohm Criterion satisfied in multiple ion species plasmas? Adventures with laser-induced fluorescence (LIF)*, Plasma Physics Seminar, University of Colorado, Boulder, Center for Integrated Plasma Studies, Oct. 1, 2007
10. *How to integrate Academic Life with (respect to) "deefaith"*, Graduate Christian Fellowship, UCSD, September 28, 2006
9. *Being the right kind of Fool*, Graduate Christian Fellowship, UCSD, March 16, 2006
8. *Diode Lasers for Ion Flow and Sheath Physics Studies in Multiple Ion Species Plasmas*, 7th APCPST (Asian Pacific Conference on Plasma Science and Technology) and 17th SPSM (Symposium on Plasma Science for Materials), Fukuoka International Congress Center, Japan, June 29- July 2, 2004
7. *Science & Faith and the search for certainty: ideas from the sermons of John Henry Newman* , Greg Severn, Intervarsity Christian Fellowship of the University of Wisconsin, Madison, September 21 2001
6. *How fast do ions fall into the sheath in a multiple ion species plasma? A progress report.*, Center for Plasma Aided Manufacturing, Fall 2001 Seminar Series, University of Wisconsin-Madison, Madison, WI, 21 September, 2001
5. *Diode lasers for laser-induced fluorescence diagnosis of distribution functions and transport coefficients in ArII plasmas, relevant for sheath physics problems of interest to the plasma processing industry and for fundamental physics problems of interest to all physical scientists everywhere.* Center for Plasma Aided Manufacturing, Spring 2001 Seminar Series, University of Wisconsin-Madison, Madison, WI, 2 February, 2001
4. *Diode lasers for laser-induced fluorescence in ArII plasmas and the search for connections between chaos and diffusion*, Physics Seminar, 25 Sept. 2000, Dept. of Physics, San Diego State University
3. *Argon ion laser induced fluorescence with Diode Lasers*, Engineering Research Center for Plasma-Aided Manufacturing, Winter Seminar Series, Jan. 23, 1998
2. *Contact: Boundaries between Physics and Faith*, Dr. Greg Severn, Faith and Science Series, Sponsored by University Ministry, University of San Diego, March 24, 1998
1. *Science & Faith* , Dr. Jack Crumley, Dr. Greg Severn, Passport to Success Program, Sponsored by University Ministry, University of San Diego, Oct. 20, 1998

Conference Papers

80. *The Maxwell Demon and its instabilities, LW2.00002 poster*, Chi-Shung Yip, J.P. Sheehan, Umair Suddiqui, Noah Hershkowitz, Greg Severn, 65th Annual Gaseous Electronics Conference, October 2226, 2012; Austin, Texas

79. *Experimental Studies of Laser-Induced Fluorescence of Kr+, NW1.00065*, Greg Severn, Tim Welsh('14), Noah Hershkowitz, 65th Annual Gaseous Electronics Conference, October 2226, 2012; Austin, Texas

78. *What's missing from the traditional explanation of NMR experiments?* Greg Severn, Jim Bolender, ALPhA (Advanced Laboratory Physics Association) 2012 Topical Conference on Laboratory Instruction: Beyond the First Year (BFY), University of Pennsylvania and Drexel University, July 25-27, 2012

77. *Will a magnet fall freely in a superconducting tube?*, Greg Severn, Tim Welsh (USD '14), ALPhA (Advanced Laboratory Physics Association) 2012 Topical Conference on Laboratory Instruction: Beyond the First Year (BFY), University of Pennsylvania and Drexel University, July 25-27, 2012

76. *The Langmuir Paradox: can the ion acoustic instability at the sheath edge thermalize the ions too? AM1.00009–oral presentation*, Hershkowitz, N.; Chi-Shung Yip; Severn, G.D., 64th Annual Gaseous Electronics Conference November 1418, 2011; Salt Lake City, Utah

75. *Kr ion Laser-Induced Fluorescence using a tunable diode laser near 729nm, AM1.00021–oral presentation*, Severn, G.D., Welsh, T.(USD, '14), 64th Annual Gaseous Electronics Conference November 1418, 2011; Salt Lake City, Utah

74.

73. *Kr ion Laser-Induced Fluorescence using a tunable diode laser near 729nm, FTP1.00095–poster presentation*, Severn, G.D., Welsh, T.(USD, '14), 64th Annual Gaseous Electronics Conference

72. *Experimental Test of Instability Enhanced Collisional Friction for Determining Ion Loss in Two Ion Species Plasmas*, Greg Severn, Chi-Shung Yip, and Noah Hershkowitz, 7th ICRP and 63rd GEC, October 4-8, 2010, Paris, France

71. *Experimental test of the role of ion-ion instability in determining ion loss from a two-species plasma* Hershkowitz, N. (Univ. of Wisconsin-Madison, Madison, WI, United States); Chi-Shung Yip; Severn, G.D. Source: 2010 IEEE 37th International Conference on Plasma Sciences (ICOPS 2010)

70. *Measurement of stream instability of argon-xenon plasma* Hershkowitz, N. (Univ. of Wisconsin - Madison, Madison, WI, United States); Chi-Shung Yip; Severn, G.D. Source: 2010 IEEE 37th International Conference on Plasma Sciences (ICOPS 2010), p 1 pp., 2010

69. *JO6.00005 : Experimental test of Baalrud's model for ion velocity at the sheath edge for a two ion species plasma* Noah Hershkowitz, Chi-Shung Yip, Greg Severn, 51st Annual Meeting of the APS Division of Plasma Physics, November 26, 2009; Atlanta, Georgia

68. *JP8.00053 : An experimental study of ion acoustic waves (IAW) in electronegative plasmas: can IAW measurements calibrate diagnostics for the measure of the negative ion fraction?*, Camron Proctor, Greg Severn, 51st Annual Meeting of the APS Division of Plasma Physics, November 26, 2009; Atlanta, Georgia

67. *NP6.016: The role of presheaths in establishing anisotropy at the sheath edge*, Noah Hershkowitz, Dongsoo Lee, Greg Severn, American Physical Society, 50th Annual Meeting of the Division of Plasma Physics, November 17-21, 2008

66. *VF3.00003 : Experimental studies of transverse metastable ion velocity distribution functions in the presheath of a weakly collisional argon plasma,* Greg Severn, Dongsoo Lee, and Noah Hershkowitz, American Physical Society, 61st Annual Gaseous Electronics Conference, October 13-17, 2008

65. *VF3.002: Presheaths are a useful concept; their role in establishing anisotropy at the sheath edge*, Noah Hershkowitz, Greg Severn, American Physical Society, 61st Annual Gaseous Electronics Conference, October 13-17, 2008

64. *FTP1.00021 : Xenon ion Laser-Induced Fluorescence using a tunable diode laser near 680nm*, Greg Severn (Dept. of Physics, University of San Diego), Dongsoo Lee, and Noah Hershkowitz (University of Wisconsin-Madison), 60th Gaseous Electronics Conference; Arlington, Virginia, TuesdayFriday, October 25, 2007

63. *VF2.00006 First experimental test of the generalized Bohm criterion using Ar^+ and Xe^+ LIF in Ar-Xe plasmas*, Dongsoo Lee, Noah Hershkowitz (University of Wisconsin-Madison), and Greg Severn (Dept. of Physics, University of San Diego), 60th Gaseous Electronics Conference; Arlington, Virginia, TuesdayFriday, October 25, 2007

62. *2E3: LIF Measurements of Ar+ and Xe+ in Ar-Xe Plasmas near the Sheath Boundary with Tunable Diode Lasers* D. Lee, N. Hershkowitz (Dept. of Engineering Physics, University of Wisconsin-Madison, Madison, WI, USA), G. Severn (Dept. of Physics, University of San Diego, San Diego, CA, USA), IEEE International Conference on Plasma Science, 2007, Albequerque NM, June 17-22, 2007

61. *JP1.00101 : How fast are ions lost from plasma with two ion species?* Noah Hershkowitz Dongsoo Lee, University of Wisconsin-Madison, Greg D. Severn, University of San Diego, Lutfi Oksuz, Suleyman Demirel Univ, Isparta, Turkey, 48th Annual Meeting of the Division of Plasma Physics, October 3, 2006; Philadelphia, Pennsylvania

60. *SRP2.00006 : LIF Measurement of Argon in Ar-Xe Plasma Sheath Boundary with Tunable Diode Laser*, Dongoo Lee, Noah Hershkowitz, University of Wisconsin-Madison, G.D. Severn, University of San Diego, 2006 59th Annual Gaseous Electronics Conference, Oct. 12, 2006, Ohio State University, Columbus, OH.

59. *SRP2.00002 A new scheme for laser-induced fluorescence measurements in Xe II plasmas*, G.D. Severn, University of San Diego, Dongoo Lee, Noah Hershkowitz, University of Wisconsin-Madison, 2006 59th Annual Gaseous Electronics Conference, Oct. 12, 2006, Ohio State University, Columbus, OH.

58. *Studies of sheath physics in two ion species plasmas with diode laser LIF*, Greg Severn (University of San Diego), Noah Hershkowitz (University of Wisconsin-Madison), M.M. Turner (Dublin City University, Dublin Ireland), 58th Gaseous Electronics Conference SundayThursday, October 17, 2005; San Jose, California

57. *Asymmetry reversal of ion collection by Mach probe in flowing unmagnetized plasma*, Eunsuk Ko, Xu Wang, Noah Hershkowitz (Dept. of Engineering Physics, University of Wisconsin - Madison), Gregory Severn (Dept. of Physics, University of San Diego), 58th Gaseous Electronics Conference Thursday, October 17, 2005; San Jose, California

56. *Diode lasers for ion flow and sheath physics studies in multiple ion species plasmas* Greg Severn (University of San Diego), Xu Wang, Eunsuk Ko, Noah Hershkowitz (University of Wisconsin-Madison), Miles Turner (Dublin City University), USD-UW Collaboration, USD-UW-DCU Collaboration, 57th Gaseous Electronics Conference, Shannon, The Republic of Ireland, September 26-29, 2004

55. *Measurement of Ion velocity by Mach probes in flowing unmagnetized plasmas*, E. Ko, X. Wang, N. Hershkowitz (Dept. of Engineering Physics, University of Wisconsin), G. Severn (Dept. of Physics, University of San Diego), 57th Gaseous Electronics Conference, Shannon, The Republic of Ireland, September 26-29, 2004

54. *Diode lasers for ion flow and sheath physics studies in multiple ion species plasmas* Greg Severn (University of San Diego), Xu Wang, Eunsuk Ko, Noah Hershkowitz (University of Wisconsin-Madison), Miles Turner (Dublin City University), USD-UW Collaboration, USD-UW-DCU Collaboration, 57th Gaseous Electronics Conference, Shannon, The Republic of Ireland, September 26-29, 2004

53. *on drift velocity measurement by Mach probes in unmagnetized plasmas*, Eunsuk Ko, Xu Wang, Noah Hershkowitz (Dept. of Engineering Physics, University of Wisconsin - Madison), Greg Severn (Dept. of Physics, University of San Diego), 46th Annual Meeting of the Division of Plasma Physics November 15-19, 2004 Savannah, GA

52. *(NWP 47) Ar ions fall out faster than 'Bohm' a multiple ion species plasma. Why?*, Greg Severn, Noah Hershkowitz, Xu Wang, Eunsuk Ko (Dept. of Engineering Physics, University of Wisconsin-Madison), UW-Madison Collaboration. 56th Gaseous Electronics Conference, San Francisco, California October21-24, 2003

51. *FT1-1:Overview of our recent experiments and thoughts about plasma presheaths* Noah Hershkowitz, Eunsuk Ko, Xu Wang, (University of Wisconsin-Madison), Greg Severn (University of San Diego), 56th Gaseous Electronics Conference, San Francisco, California October21-24, 2003

50. *How LIF has helped to understand ion loss at the boundaries of weakly collisional plasmas* Noah Hershkowitz, Eunsuk Ko, Xu Wang, L. Oksuz, A. Hala (Dept. of Engineering Physics and Center for Plasma-Aided Manufacturing University of Wisconsin-Madison), Greg Severn (University of San Diego), 45th Annual Meeting of the Division of Plasma Physics, Albuquerque, New Mexico, October 27-31, 2003

49. *LIF Measurements of the Bohm Criterion for two ion species plasmas*, G.D. Severn, USD, GEC02 Special Workshop on Plasma Sheaths. 55th Annual Gaseous Electronics Conference, Minneapolis, MN, 16 October 2002.

48. *LIF measurements of the Bohm Criterion for two ion species*, Greg Severn, University of San Diego, Xu Wang, and Noah Hershkowitz, University of Wisconsin-Madison, Special Workshop on Plasma Sheaths, 55th Annual Gaseous Electronics Conference, Minneapolis, MN, 15 October 2002.

47. *How fast do ions fall into the sheath in a multiple ion species plasma?* Greg Severn, University of San Diego, Xu Wang, and Noah Hershkowitz, University of Wisconsin, Madison, Poster QWP.057, 55th Annual Gaseous Electronics Conference, Minneapolis, MN, 16 October 2002.

46. *The Measurement of Ion Drift Velocities in Presheath in Single and Two Ion Species Plasmas* , Xu Wang, Eunsuk Ko, and Noah Hershkowitz, University of Wisconsin, and Greg Severn, University of San Diego, QWP.056, 55th Annual Gaseous Electronics Conference, Minneapolis, MN, 16 October 2002.

45. *FT1.005: How fast do ions fall out of a weakly collisional two species plasma?* Noah Hershkowitz, Xu Wang, Eunsuk Ko (University of Wisconsin-Madison), Greg Severn (University of San Diego). Talk, 55th Annual Gaseous Electronics Conference, Minneapolis, MN, 16 October 2002.

44. *Ion Drift Velocities at Sheath/Presheath Boundary in Weakly Collisional Plasmas with Two Ion Species* Noah Hershkowitz, Eunsuk Ko, Xu Wang (Dept. of Engineering Physics and Center for Plasma-Aided Manufacturing University of Wisconsin-Madison), Greg Severn (University of San Diego). 44th Annual Meeting of the Division of Plasma Physics, November 11-15, 2002; Orlando, Florida

43. *Presheaths in weakly collisional plasmas with two ion species*, Noah Hershkowitz, Xu Wang, Eunsuk Ko (University of Wisconsin-Madison, USA), Greg Severn (University of San Diego, USA), Joint Conference ESCAMPIG 16. Sixteenth European Conference on Atomic and Molecular Physics of Ionized Gases. ICRP 5 Fifth International Conference on Reactive Plasma. Conference Proceedings, 2002, pt. 1, p 31-2 vol.1

42. *Presheaths in weakly collisional plasmas with two ion species*, Noah Hershkowitz, Xu Wang, Eunsuk Ko (University of Wisconsin-Madison), Greg Severn (University of San Diego). IEEE International Conference on Plasma Science, 2002, p 165

41. *Synthesis and Separation in Science & Faith: Ideas and Opinions of James Clerk Maxwell* , G.D. Severn, 57th annual conference of the ASA Pepperdine University, Aug 3, 2002

40. *How fast do ions fall into the sheath in a multiple ion species plasma?* , Greg Severn, Noah Hershkowitz, and Xu Wang, KP1.071, Proceedings of the 43rd Annual Meeting of the American Physical Society-DPP01, Oct. 31 2001, Long Beach CA.

39. *How fast do ions fall into the sheath in multiple ion species plasmas?* , Greg Severn, Noah Hershkowitz, and Xu Wang, Conference Proceedings of the 54th Gaseous Electronics Conference, GEC01, Penn State University, State College, PA, Oct. 12, 2001

38. *Does it make sense to talk about presheaths?* Noah Hershkowitz, Lutfi Oksuz, Greg Severn, Xu Wang, F1.004, Conference Proceedings of the 54th Gaseous Electronics Conference, GEC01, Penn State University, State College, PA, Oct. 12, 2001

37. *LIF Diagnostic Development for Diffusion Coefficient Measurements in Low Temperature ArII plasmas using Diode Lasers* , G.D. Severn, Conference Proceedings of the 28th IEEE International Conference on Plasma Science, Las Vegas, June 17-21, 2001

36. *Diagnostic Development of a Mach Probe and Laser-Induced Fluorescence Instrument for Diffusion Measurements in a Low Temperature Plasma.* J.A. Langton, J. Tallant[6], and G.D. Severn, American Association of Physics Teachers Winter Meeting, 10 January 2001.

35. *Diagnostic development of a diode laser based LIF instrument for velocity space diffusion measurements in quiescent and chaotic low temperature thermionic discharge plasmas* , G.D. Severn, Poster 3P27, 27th, IEEE International Conference on Plasma Science, New Orleans, LA, June 4-7, 2000.

34. *Experimental Studies of Nonlinear Dynamics and Diffusion in Low Temperature Plasmas* Tom Steffensen, Michael Leonard[7], and Greg Severn, Poster RP01.132, Centennial Meeting of the American Physical Society, Atlanta Georgia, March 24, 1999

33. *Chaos in Coutte Flow* , Greg Wong and[8] Greg Severn, USD Undergraduate Research Conference, Spring 1998. I directed Greg's research work during his Physics 196 course. He reported on his work both in the poster session at the Undergraduate Research Seminar during the spring, but also in his Senior Seminar.

32. *Measuring the Ratio of Specific Heats, C_p/C_v* , Tom Steffensen and Greg Severn, USD Undergraduate Research Conference, Spring 1998. I have been developing a new laboratory physics experiment with Tom's help; he presented the data that he took at the research conference at USD, I presented my ideas at the joint APS/AAPT research conference, at we are working now on a manuscript for publication.

31. *Ruchardt's Experiment Revisited: a new C_p/C_v Measurement* , G.D. Severn, Poster H24.11, Joint American Physical Society, American Association of Physics Teachers Meeting, Ohio, April 19th, 1998

30. *Experimental Studies of Diffusion and Lyapunov Exponents,* G. D. Severn, Poster pThpP1.10, 39th Annual Meeting of the American Physical Society, Nov. 7-12, 1997, Pittsburgh PA.

29. *Diode lasers for ion transport measurements* , G.D. Severn, D.A. Edrich, and R. Mcwilliams, 38th Annual American Physical Society, Division of Plasma Physics Meeting, Denver, CO, 11/12/96, Poster 4Q12

28. *Ion diffusion due to electrostatic turbulence* , G.D. Severn, D.A. Edrich, and R. Mcwilliams, 38th Annual American Physical Society, Division of Plasma Physics Meeting, Denver, CO, 11/12/96, Poster 4Q12

27. *Diode Lasers for Plasma Physics* , G.D. Severn, D.A. Edrich, and R. McWilliams, 43rd Annual Western Spectroscopy Association Conference, Monterey CA, Jan. 31, 1996, poster # 15

26. *Long Ion Confinement Times Using a 'Rotating Wall'* , F.A. Anderegg, X-Pei. Huang, C.F. Driscoll, G.D. Severn, and E. Sarid, Aip Conference Proceedings 331, Non-neutral Plasma Physics II, J. Fajans, D.H.E. Dubin, Eds., AIP Press, p.1, 1995

25. *Ion plasma diagnosed by LIF* , F. Anderegg, X.-P. Huang, E. Sarid, G.D. Severn, and C.F. Driscoll, American Institute of Physics Nonneutral Plasma Workshop, University of California, Berkeley, July 17, 1994

24. *In Situ LIF Measurements of a Pure Ion Plasma* , F. Anderegg, X.-P. Huang, G.D. Severn, and C.F. Driscoll, 36th Annual Meeting, American Physical Society Division of Plasma Physics, Minneapolis, Mn, Sept. 7-11, 1994

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