

Wendell Horton

Education

- B.S., Physics, The University of Texas at Austin, 1963
- M.S., Physics, University of California, San Diego, 1965
- Ph.D., Physics, University of California, San Diego, 1967

Professional Experience

- Associate Professor of Physics at The University of Texas at Austin, 1969 to 1977.
- Professor of Physics at The University of Texas at Austin, 1977 to present.
- Research Scientist, Fusion Research Center, 1969 to 1980.
- Research Scientist, Institute for Fusion Studies, 1980 to present.
- Adjunct Professor, Rice University, Department of Space Physics and Astronomy, 1992 to 2002.

Professional and Public Service

- Member, Excellence in Geophysical Education Award Committee, American Geophysical Union, July, 2004 to June 30, 2006.
- Chair, Selection Committee for the Excellence in Plasma Physics Research Award, American Physical Society, 2005.
- Vice-Chairman, Selection Committee for the Excellence in Plasma Physics Research Award, American Physical Society, 2004.
- Co-Chair, Local Organizing Committee for 2003 International Sherwood Fusion Theory Conference, May 28-30, 2003, Corpus Christi, Texas.
- Thermonuclear Panel Member of CEA Committee that compared the Ignitor and Reduced Cost ITER Tokamak Options for the Next Step in Fusion Power.
- Chairman of AGU Fall San Francisco Session SM52 on Substorms and Storms I, December 6, 2002.
- Member of IFS Advisory Committee from January 2001.
- Thermonuclear Tokamak Panel, Commissariat a L'Energie Atomique, for evaluation of Ignitor and ITER-FEAT, Paris, France, November 1999-2000.

Awards and Honor Societies

- Named one of top ten journal referees by Nuclear Fusion, 2005.
- Journal of Geophysical Research Editor's Citation for Excellence in Refereeing in Space Physics signed by Prof. Tamas Gambosi in 1994.
- Certificate of Appreciation signed by 1992 by William Haper as Director of the Office of Energy Research in the Department of Energy for service to Fusion Programs in collaborations with Japan.
- Fellow, American Physical Society, 1983.

University and Departmental Committees

- IFS Director's Advisory Committee, 2001 to present
- Physics Department/IFS Faculty Search Committee, 1992-1993

Courses Taught

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| • PHY 609 | Physics for Non-Technical Students |
| • PHY 302K,L | General Physics-Tech |
| • PHY 303L | Engineering Physics II |
| • PS 303, 304 | Physical Science |
| • PHY 306 | Elementary Physics Methods |
| • PHY 385K | Classical Mechanics |
| • PHY 385L | Statistical Physics |
| • PHY 387K,L | Electricity and Magnetism |
| • PHY 380L | Introductory Plasma Physics |
| • PHY 380M | Plasma Stability Theory |
| • PHY 390M | Advanced Plasma Physics |
| • PHY 391M,N | Nonlinear Plasma Theory |
| • PHY 390C | Special Topic in Plasma Physics |
| • PHY 391S | Plasma Physics Seminar |
| • PHY 104 | Introductory Physics Seminar |

Research in Progress

Theoretical studies of plasma dynamics are being carried out under a U.S. Department of Energy contract and NSF Grant. The general purpose of the programs is to provide the scientific understanding the turbulent transport processes in plasmas. This includes the study of equilibria, stability and transport in both laboratory and space environments. The primary funding is through the Institute for Fusion Studies with the mission to provide the necessary understanding to support the quest for controlled thermonuclear fusion The primary thrust of the NSF work is to provide theory and modeling to support understanding of the solar wind driven the magnetic storms and substorms in the Earth's space environment. These space storms disrupt communications and

power distributions systems. The research involves graduate students and post-doctoral students.

Research Support

- Three-year National Science Foundation Grant for *Solar Wind Driven Magnetospheric-Ionospheric Complex Dynamic Model*. \$424,785 for April 2003-March 2006.
- Two-year Civilian Research and Development Foundation Grant for *Planetary Waves and Nonlinear Solitary Vortical Structures in the Earth's Ionosphere*. \$6,050 for March 2003-February 2005.
- One-year National Science Foundation (via Univ. of Michigan) Grant for *Laser Target Interactions and Space/Solar Physics Simulation Experiments*. (co-investigators, Boris Breizman, and Charles Chiu) \$54,000 for January 2003-December 2003.
- Three-year National Science Foundation Grant for *A Low Dimensional Dynamical Model for the Solar Wind Driven Geotail-Ionosphere System*. \$350,465 for March 2000-March 2003.
- Four-year National Science Foundation Grant for *Simulation Study of Space Plasma Physics*. \$200,588 for July 1999-June 2003.
- Three-year National Science Foundation Grant for *Low-Dimensional Models for Solar Wind Driven Magnetosphere-Ionosphere System*. (co-investigators, T. Tajima and subcontract to Isidoros Doxas at UC Boulder). \$90,000 for 2000 and \$120,000 for 2001.

Selected Publications (2000 – 2007; out of 283 publications)

- R.S. Weigel, W. Horton and I. Doxas, Substorm Classification with the WINDMI Model, *Nonlinear Processes in Geophysics*, 10, 363 (2003).
- W. Horton, C. Chiu, T. Ditmire, P. Valanju, R. Presura, V.V. Ivanov, Y. Sentoku, V.I. Sotnikov, A. Esaulov, N. Le Galloudec, T.E. Cowan, I. Doxas, Laboratory simulation of magnetospheric plasma shocks, *Advances in Space Res.* doi:10.1016/j.asr.2005.01.087.
- M.J. Mithaiwala and W. Horton, Substorm injections produce sufficient electron energization to account for MeV flux enhancements following some storms, *Journal of Geophysical Research*, Vol. 110, A07224, doi:10.1029/2004JA010511 (2005).
- R. Presura, V.V. Ivanov, Y. Sentoku, V.I. Sotnikov, P.J. Laca, N. Le Galloudec, A. Kemp, R. Mancini, H. Ruhl, A.L. Astanovitskiy, T.E. Cowan, T. Ditmire, C. Chiu, W. Horton, P. Valanju and S. Keely, Laboratory Simulation of Magnetospheric Plasma Shocks, *Astrophysics and Space Science* 298: 299-303 (2005).
- W. Horton, C. Chiu and T. Ditmire, Laboratory Simulations of Bow Shocks and Magnetospheres, *Astrophysics and Space Science* 298: 395-401 (2005).
- H. Vernon Wong, B.-Y. Xu, W. Horton, J. Pratt and J.W. Van Dam, Nonlinear evolution of the firehose instability in a magnetic dipole geotail geometry, *Phys. of Plasmas* 12, 056502 (2005).
- G. Gogoberidze, L. Samushia, G.D. Chagelishvili, J.G. Lominadze and W. Horton, Surface gravity waves in deep fluid at vertical shear flows, *Journal of Experimental and Theoretical Physics* 101 (1): 169-176, 2005.
- W.S. Lewis, J.L. Burch, J. Goldstein, W. Horton, J.C. Perez, H.U. Frey, P.C. Anderson, Duskside auroral undulations observed by IMAGE and their possible association with large-scale structures on the inner edge of the electron plasma sheet, *Geophysical Research Letters* 32 (24): Art. No. L24103 DEC 20 2005.
- W. Horton, E. Spencer, I. Doxas, J. Kozyra, Analysis of the October 3-7 2000 GEM storm with the WINDMI model, *Geophysical Research Letters* 32 (22): Art. No. L22102 NOV 17 2005.
- J.C. Perez, W. Horton, K. Gentle, W.L. Rowan, K. Lee, R.B. Dahlburg, Drift wave instability in the Helimak experiment, *Physics of Plasmas* 13 (3): Art. No. 032101 MAR 2006.
- J.-H. Kim, J.C. Perez, W. Horton, G.D. Chagelishvili, R.G. Changishvili, J.G. Lominadze, J.C. Bowman, Self-sustaining vortex perturbations in smooth shear flows, *Physics of Plasmas* 13 (6): Art. No. 062304 JUN 2006.
- J.C. Perez, W. Horton, R.D. Bengtson, T. Carter, Study of strong cross-field sheared flow with vorticity probe in the large plasma device, *Phys. of Plasmas* 13, (057701) 2006.
- W. Horton, J.-H. Kim, F. Militello, M. Ottaviani, Turbulent Impulsive Magnetic Energy Releases from Electron scale reconnection, *Phys. of Plasmas* 14, (012902) 2007.
- M. L. Mays, W. Horton, J. Kozyra, T. H. Zurbuchen, C. Huang, and E. Spencer, Effect of Interplanetary Shocks on the AL and Dst Indices, *Geophysical Research Letters*, *Geophys. Res. Lett.*, 34, L11104, doi:10.1029/2007GL029844.
- E. Spencer, W. Horton, M. L. Mays, I. Doxas, and J. Kozyra (2007), Analysis of the 3-7 October 2000 and 15-24 April 2002 geomagnetic storms with an optimized nonlinear dynamical model, *J. Geophys. Res.*, 112, A04S90, doi:10.1029/2006JA012019.

Books and Chapters:

- W. Horton, M.J. Mithaiwala, E.A. Spencer, and I. Doxas, "WINDMI, a family of Physics network models for storms and substorms", a chapter in the book *Multiscale Coupling of Sun-Earth Processes*, ed. by A.T.Y. Lui, Y. Kamide and G. Consolini, Elsevier Publ. Co., Amsterdam, The Netherlands, p. 431-446, 2005.