

**ROBERT L. LYSAK**  
**Professor**

**Research Interests**

Particle acceleration and the dynamics of current flow in the earth's auroral zone. Related areas include generation of electric and magnetic fields in the magnetosphere, plasma instabilities and turbulence, wave heating of ions, magnetic reconnection, and magnetohydrodynamic waves and turbulence. Both analytic and numeric techniques are used, with present emphasis on development of large scale computer models of auroral phenomena.

Birthdate: January 18, 1955

**Education and Experience**

Education: Ph.D., University of California, Berkeley, 1980  
B.S., Michigan State University, 1975

Positions: Professor, University of Minnesota, 1991-present  
Director of Graduate Studies, Physics, University of Minnesota, 1995-2001  
Associate Professor, University of Minnesota, Sept. 1987-1991  
Visiting Associate Research Professor, Dartmouth, College, Summer 1989-1992  
Assistant Professor, University of Minnesota, Sept. 1982-1987  
Stipendiat, Max Planck Institut für Physik u. Astrophysik, Garching bei Munchen, West Germany, March 1981-Nov. 1981  
Assistant Research Physicist, University of California, Berkeley, 1980-Sept. 1982  
Research Assistant, University of California, Berkeley, 1976-1980  
Teaching Assistant, University of California, Berkeley, 1975-1977

**Professional Activities and Honors**

Honors: Editor's Citation for Excellence in Refereeing, *Journal of Geophysical Research*, 2004.  
George Taylor Teaching Award, Institute of Technology, University of Minnesota, 1989  
Bush Sabbatical Program Award, 1989  
Presidential Young Investigator Award, 1985  
Teaching Associate Award, University of California, Berkeley, 1976  
Undergraduate Physics Award, Michigan State University, 1975

Societies: American Geophysical Union  
American Physical Society

Service: Program Committee, Chapman Conference on Ion Acceleration, June 1985

Member's Representative, University Corporation for Atmospheric Research, 1988-1992

Education Committee, Solar Planetary Relationships Division, AGU, Chair, 1988-1990; Member, 1990-1992

Associate Editor, Geophysical Research Letters, 1989-1992

Convenor, Theoretical Physics Institute Workshop on Magnetopause Reconnection and Coupling to the Ionosphere, Minneapolis, MN, Sept. 1988

Member, Geospace Environment Modeling program steering committee, National Science Foundation, 1989-1992

Associate Editor, Journal of Geophysical Research, 1990-1993

Co-editor, U.S. National Report to the International Union of Geodesy and Geophysics, Solar-Planetary Relationships, 1991

Convenor, Chapman Conference on Auroral Plasma Dynamics, Minneapolis, MN, October 1991

Member, Magnetospheric Management Operations Working Group, NASA, 1992-1994

Secretary, Magnetospheric Physics Section, American Geophysical Union, 1992-1996

Convenor, Symposium on Magnetopause and Boundary Layers and Their Coupling to the Ionosphere, International Association of Geomagnetism and Aeronomy, Buenos Aires, August 1993

Program Committee, Chapman Conference on Magnetospheric Current Systems, Kona, Hawaii, January 1999

Program Committee, Second Alfvén Conference on Auroral Particle Acceleration, Stockholm, May 1999

Co-editor: Magnetospheric Current Systems, AGU Monograph, 1999

Editor, Symposium on "Alfvénic Structures: From the Sun to the Magnetosphere," *Advances in Space Research*, 2001

Convenor, Symposium on "The Role of Waves and Instabilities in Field-Aligned Currents and Auroral Particle Acceleration," 2001 IAGA-IASPEI Joint Scientific Assembly, Hanoi, Vietnam, August, 2001

Member, National Academy of Sciences, Solar and Space Physics Survey Panel on Magnetosphere-Ionosphere-Atmosphere, 2001

Chapman Conference Chair, American Geophysical Union, 2002-2006.

Convener, Winckler Symposium: Fast time variations of auroral particle participation, Minneapolis, April, 2004.

Convener, Symposium on "Electrodynamics of Aurora," 2005 IAGA Scientific Assembly, Toulouse, France, July, 2005.

Convener, Symposium on "Nonlinear and Kinetic Physics of ULF and VLF Waves," AGU Fall Meeting, San Francisco, 2005.

Co-editor, *Magnetospheric ULF Waves: Synthesis and New Directions*, AGU Monograph 169, 2006.

Co-convener, Symposium on "Ionosphere-Magnetosphere Coupling and Auroral Particle Acceleration, 36<sup>th</sup> COSPAR Scientific Assembly, Beijing, China, July, 2006.

Co-director, School on "Turbulence and Waves in Space Plasmas,"  
International School of Space Science, L'Aquila, Italy, September,  
2007.

### **Invited Talks**

*1980*

Particle acceleration and energy flow in a nearby astrophysical object, U.C. Berkeley  
Space Sciences Colloquium  
Ion and electron acceleration by strong electrostatic turbulence, Chapman Conference on  
the Formation of Auroral Arcs, Fairbanks, Alaska

*1981*

Electrostatic ion cyclotron turbulence and auroral particle acceleration, Los Alamos  
National Laboratory  
Electrostatic ion cyclotron turbulence and auroral particle acceleration, University of  
Minnesota Space Physics Seminar  
Effects of turbulence on Alfvén wave propagation in the auroral zone, Max-Planck-  
Institut Extraterrestrische Council, Schloss Reisenburg, Gunzburg, West Germany  
Microscopic turbulence and auroral particle acceleration, Ruhr-Universität, Bochum,  
West Germany

*1982*

Theories and wave observations associated with ion conics, with M. Temerin, Yosemite  
Conference on Origins of Plasma and Electric Fields in the Magnetosphere, Yosemite  
Park  
Energy flow and particle acceleration in the auroral zone, Royal Institute of Technology,  
Stockholm, Sweden

*1983*

Dynamics of magnetosphere-ionosphere coupling on auroral field lines, Naval Research  
lab seminar, Washington, D.C.  
Dynamics of magnetosphere-ionosphere coupling on auroral field lines, APS Spring  
Meeting, Baltimore

*1984*

Propagation of kinetic Alfvén waves in low beta, turbulent plasmas, XXIst General  
Assembly of URSI (International Union of Radio Science), Florence, Italy  
Dynamics of auroral current flow, University of Minnesota Astronomy Colloquium  
Modeling hydromagnetic waves in the earth's auroral zone, 2nd International School of  
Space Simulation, Kapaa, Kauai, Hawaii

1985

Alfven wave propagation on auroral flux tubes, University of Iowa Space Physics Seminar, Iowa City, Iowa  
Ion acceleration by wave-particle interaction, Chapman Conference on Ion Acceleration in the magnetosphere and ionosphere, Wellesley, MA  
Auroral electrodynamics, University of Minnesota Physics Colloquium

1986

Effect of double layers on magnetosphere-ionosphere coupling, Huntsville Workshop on Double Layers in Astrophysics, Marshall Space Flight Center, Huntsville, AL  
A three-dimensional model of auroral electrodynamics, Dartmouth College Space Physics Seminar, Hanover, N.H.  
Making connections between global magnetospheric models and simulations of microscopic plasma processes, Huntsville Workshop on Magnetosphere/Ionosphere Plasma Models, Guntersville, AL

1987

Microscopic aspects of solar wind-magnetosphere-ionosphere coupling, five tutorial lectures, Cambridge Workshop on Ionosphere-Magnetosphere-Solar Wind Coupling, MIT, Cambridge, MA

1988

Time dependent magnetosphere-ionosphere coupling, Workshop on Magnetosphere-Ionosphere Coupling and Substorm Phenomena, Fairbanks, AK  
Coupling of the dayside magnetopause to the ionosphere, Canadian Association of Physicists Congress, Montreal, Quebec

1989

Electron wave interactions on auroral field lines, Cambridge Workshop on Wave-Particle Interaction Phenomena in Geoplasmas, Cambridge, MA  
Introduction to kinetic effects of ULF waves, IAGA Scientific Assembly, Exeter, England

1990

Effects of plasma waves on auroral electron distributions, Yosemite Conference on Transition Regions in Solar System Plasma, Yosemite, California  
Structuring of auroral currents by ionospheric interactions, Cambridge Workshop on Magnetic Fluctuations, Diffusion and Transport in Geoplasmas, Cambridge, Mass.  
Coupling of compressional and Alfven waves in the magnetosphere, Western Pacific Geophysics Meeting, Kanazawa, Japan  
Time-dependent magnetosphere-ionosphere coupling during substorms, Chapman Conference on Magnetospheric Substorms, Hakone, Japan

*1991*

Auroral electrodynamics, U. Texas at Dallas Physics Colloquium  
Structuring of auroral current systems, U.S. Antarctic Experimenters Meeting, Augsburg  
College  
Structuring of auroral current systems, Auroral Plasma Dynamics Workshop, Victoria,  
B.C., Canada

*1992*

Mesoscale magnetosphere-ionosphere coupling, Chapman Conference on Meso-and  
Microscale Phenomena in Space Plasmas, Kauai, Hawaii  
Fast ionosphere feedback instability, International Conference on Substorms, Kiruna,  
Sweden  
Thickness of auroral arcs, Plasma Seminars, Cornell University and University of  
Wisconsin  
The Alfvén wave model of auroral arcs, 1992 Cambridge Workshop on Theoretical  
Geoplasma Physics, Cambridge, MA  
Electron acceleration in the Alfvén wave model of auroral arcs, Third Huntsville  
Workshop on Sources, Transport, Energization and Loss of Magnetospheric Plasmas,  
Guntersville, Alabama  
Global oscillations of the geomagnetic field, APS New England Division Meeting,  
Hanover, New Hampshire

*1993*

Magnetospheric current systems driven by the solar wind-magnetosphere interaction,  
GEM Workshop on the Boundary Layer Campaign, Snowmass, Colorado  
Strong turbulence in the auroral zone, Cambridge Workshop on Chaos, Stochasticity and  
Strong Turbulence, Cambridge, Massachusetts  
Eigenmodes of the magnetosphere and ionosphere, 7th Scientific Assembly of the  
International Association of Geomagnetism and Aeronomy, Buenos Aires, Argentina  
Alfvén waves and auroral particle acceleration, 1993 AGU Fall Meeting, San Francisco

*1994*

Coupling of the magnetopause to the ionosphere, Seminar, NOAA Space Environment  
Laboratory, Boulder, Colorado  
The formation of small-scale auroral arcs, Seminar, High Altitude Observatory, NCAR,  
Boulder, Colorado  
Formation of auroral arcs by inertial Alfvén waves during substorms, International  
Conference on Substorms—2, Fairbanks, Alaska  
Coupling of the magnetopause to the ionosphere by means of Alfvén waves and field-  
aligned currents, Chapman Conference on Physics of the Magnetopause, San Diego  
Electric and magnetic field signatures of the ionospheric Alfvén resonator, Freja  
International Workshop on Small-Scale Auroral Physics, Banff, Alberta, Canada

*1995*

Alfvén waves and the dynamics of auroral arcs, University of Houston Physics Colloquium  
New developments in the theory of auroral spirals and curls, IUGG XXI General Assembly, Boulder, Colorado  
Structuring of currents in auroral spirals, 1995 Fall AGU Meeting, San Francisco

*1996*

Alfvén waves and the aurora, 1996 Spring AGU Meeting, Baltimore  
Alfvén wave model of auroral arcs, University of Iowa Physics Colloquium

*1997*

Propagation of Alfvén waves through the ionosphere, International Association of Geomagnetism and Aeronomy, Uppsala, Sweden, August 1997  
Evolution of Alfvén wave turbulence in auroral arcs, AGU Fall Meeting, San Francisco, December 1997

*1998*

Dynamics of auroral arc formation during substorms, 4th International Conference on Substorms, Lake Hamano, Japan, March 1998  
Alfvén waves and the auroral density cavity, FAST Auroral Workshop, Two Harbors, MN, August 1998  
Modeling magnetosphere-ionosphere coupling in global fluid models, AGU Fall Meeting, San Francisco, December 1998

*1999*

The role of Alfvén waves in the formation of auroral parallel electric fields, Chapman Conference on Magnetospheric Current Systems, Kona, HI, January 1999  
Magnetosphere-ionosphere coupling and the formation of auroral arcs, 2<sup>nd</sup> Alfvén conference on Auroral Particle Acceleration, Stockholm, Sweden, May, 1999  
Can Alfvén waves maintain large parallel electric fields? American Geophysical Union 1999 Fall Meeting, San Francisco, December, 1999

*2000*

Alfvénic structures and the development of auroral arcs, Committee on Space Research (COSPAR) 33<sup>rd</sup> Scientific Assembly, Warsaw, July, 2000  
Influence of the ionosphere on magnetotail convection, First S-RAMP Conference, Sapporo, Japan, October, 2000  
A three-dimensional model of the propagation of Alfvén waves through the auroral ionosphere, American Geophysical Union Fall Meeting, San Francisco, December, 2000

## 2001

- Microscale physics and auroral dynamics: Reporter Review, 2001 IAGA/IASPEI Joint Scientific Assembly, Hanoi, Vietnam, August, 2001
- Alfvén waves and auroral particle acceleration, Beijing University, September, 2001
- Alfvén waves and auroral particle acceleration, Space Research Institute of Academia Sinica, Beijing, September, 2001
- Auroral zone plasma physics (3 lectures), Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, October, 2001

## 2002

- Low-frequency electron kinetics on auroral field lines (with Y. Song), Sixth International Conference on Substorms, Seattle, WA, March, 2002
- Kinetic theory of Alfvén waves on auroral field lines, Space physics seminar, University of Alberta, September, 2002
- Kinetic theory of Alfvén waves on auroral field lines, Physics and Astronomy Colloquium, Dartmouth College, September, 2002

## 2003

- Alfvén waves as an energy source for the aurora, Astronomy Colloquium, University of Minnesota, March, 2003
- Interactions between Alfvén waves and electrons along auroral field lines, AGU/EGS/EUG Joint Assembly, Nice, France, April 2003
- Electrodynamic Coupling of the Magnetosphere and Ionosphere, Student-sponsored tutorial, GEM Workshop, Snowmass, CO, June 2003.
- Auroral Acceleration in the Ionospheric Alfvén resonator, IUGG 2003 XXIII General Assembly, Sapporo, Japan, June, 2003.
- Multi-scale Physics in the Auroral Acceleration Region: Reporter Review, IUGG 2003 XXIII General Assembly, Sapporo, Japan, July, 2003.

## 2004

- Nonlocal kinetic theory of Alfvén Waves along Auroral Field Lines, University of Sydney Plasma Physics Seminar, May, 2004.
- Theory of the Ionospheric Alfvén Resonator, University of Newcastle (Australia) Physics Colloquium, June, 2004.
- Magnetosphere-Ionosphere Coupling by Alfvén Waves: Beyond Current Continuity, COSPAR Scientific Assembly, Paris, July, 2004.
- Particle Acceleration by Alfvén Waves in the Auroral Zone, 3<sup>rd</sup> Alfvén Conference on Alfvén Waves in Space Plasmas, Steamboat Springs, CO, August, 2004.

## 2005

- Numerical Modeling of Magnetosphere-Ionosphere Coupling in Dipole Geometry, AGU Chapman Conference on Magnetospheric ULF Waves, San Diego, March, 2005.

Modeling of ULF Waves in Dipole Geometry, 10<sup>th</sup> Scientific Assembly of the International Association of Geomagnetism and Aeronomy, Toulouse, France, July 2005.

2006

Bounce Resonant Instabilities of Alfvén Waves on Auroral Field Lines, 2006 URSI North American Meeting, Boulder, CO, January, 2006.

Modeling ULF Waves at Mid-Latitudes, HAO Colloquium, National Center for Atmospheric Research, Boulder, CO, May, 2006.

FAST Contributions to Auroral Plasma Physics: Past, Present, and Future, FAST Auroral Physics Colloquium, Bodega Bay, CA, August, 2006.

Kinetic Theory of Alfvén Waves along Auroral Field Lines, 2006 Huntsville Workshop on “Outstanding Problems in Geospace Connection Modeling,” Nashville, October 2006.

2007

Kinetic Theory of Alfvén Waves in the Auroral Zone, 9<sup>th</sup> International Workshop on Interrelationships between Plasma Experiments in Lab and Space (IPELS 2007), Cairns, Australia, August, 2007.

Theory and Modeling of ULF Wave Propagation in the Magnetosphere, International School of Space Science, L’Aquila, Italy, September, 2007.

Kinetic Theory of Auroral Particle Acceleration by Alfvén Waves, 4<sup>th</sup> Alfvén Conference on Importance of Plasma Processes in Planetary Physics and Astrophysics, Arcachon, France, September, 2007.

### Publications

1. “Magnetic field-aligned potential drops due to electrostatic ion cyclotron turbulence,” M.K. Hudson, F.S. Mozer, and R.L. Lysak, *Geophys. Res. Lett.* **5**, 143 (1978).
2. “Observations of differences between regions of current flowing into and out of the ionosphere,” C.A. Cattell, R.L. Lysak, R.B. Torbert, and F.S. Mozer, *Geophys. Res. Lett.* **6**, 621 (1979).
3. “Coherent anomalous resistivity in the region of electrostatic shocks,” R.L. Lysak and M.K. Hudson, *Geophys. Res. Lett.* **6**, 661 (1979).
4. “Ion heating by strong electrostatic ion cyclotron turbulence,” R.L. Lysak, M.K. Hudson and M. Temerin, *J. Geophys. Res.* **85**, 678 (1980).
5. “Electrostatic ion cyclotron turbulence and auroral particle acceleration,” R.L. Lysak, Ph.D. thesis, University of California, Berkeley (1980).
6. “Satellite measurements and theories of low altitude auroral particle acceleration,” F.S. Mozer, C.A. Cattell, M.K. Hudson, R.L. Lysak, M. Temerin, and R.B. Torbert, *Space Sci. Rev.* **27**, 155 (1980).
7. “The effect of microscopic turbulence on magnetosphere-ionosphere coupling,” R.L. Lysak and C.W. Carlson, *Geophys. Res. Lett.* **8**, 269 (1981).
8. “The aurora inferred from S3-3 particles and fields,” P.F. Mizera, J.F. Fennell, D.R. Croley, Jr., A.L. Vampola, F.S. Mozer, R.B. Torbert, M. Temerin, R.L. Lysak, M.

- Hudson, C.A. Cattell, R.J. Johnson, R.D. Sharp, A. Ghielmetti, and P.M. Kintner, *J. Geophys. Res.* **86**, 2329 (1981).
9. "Observations of electrostatic shocks and associated plasma instabilities by the S3-3 satellite," C.A. Cattell, M.K. Hudson, R.L. Lysak, D.W. Potter, M. Temerin, R.B. Torbert, and F.S. Mozer, in *Relation between Laboratory and Space Plasmas*, ed. by H. Kikuchi, p. 115, D. Reidel, Dordrecht, Holland (1981).
  10. "Electron and ion acceleration by strong electrostatic turbulence," R.L. Lysak, *Physics of Auroral Arc Formation*, edited by S. Akasofu and J.R. Kan, p. 444, American Geophysical Union, Washington, D.C. (1981).
  11. "The small-scale structure of electrostatic shocks," M. Temerin, C.A. Cattell, M. Hudson, R.L. Lysak, R.B. Torbert, F.S. Mozer, R.D. Sharp, and P.M. Kintner, *J. Geophys. Res.* **86**, 11278 (1981).
  12. "Formation of double layers on auroral field lines," R.L. Lysak, W. Lotko, M.K. Hudson, and E. Witt, *Proc. of Symposium on Plasma Double Layers*, Riso National Laboratory, Roskilde, Denmark, June (1982), p. 274.
  13. "Dynamics of magnetosphere-ionosphere coupling including turbulent transport," R.L. Lysak and C.T. Dum, *J. Geophys. Res.* **88**, 365 (1983).
  14. "Generation of Alfvén-ion cyclotron waves on auroral field lines in the presence of heavy ions," R.L. Lysak and M.A. Temerin, *Geophys. Res. Lett.* **10**, 643 (1983).
  15. "Simulation of beam excited minor species gyroharmonics in the Porcupine experiment," I. Roth, C.W. Carlson, M.K. Hudson, and R.L. Lysak, *J. Geophys. Res.* **88**, 8115 (1983).
  16. "The Polar Magnetosphere," review of *High Altitude Space Plasma Physics* by B. Hultqvist and T. Hagfors (eds.), R.L. Lysak, in *Science* **222**, 1227 (1983).
  17. "Electromagnetic ion cyclotron (ELF) waves generated by auroral electron precipitation," M.A. Temerin and R.L. Lysak, *J. Geophys. Res.* **89**, 2849 (1984).
  18. "Auroral electrodynamics with current and voltage generators," R.L. Lysak, *J. Geophys. Res.* **90**, 4178 (1985).
  19. "Ion acceleration by wave-particle interaction," R.L. Lysak, in *Ion Acceleration in the Magnetosphere and Ionosphere*, T. Chang (ed.), p. 261, AGU Monograph 38 (1986).
  20. "Coupling of the dynamic ionosphere to auroral flux tubes," R.L. Lysak, *J. Geophys. Res.* **91**, 7047 (1986).
  21. "Effect of double layers on magnetosphere-ionosphere coupling," R.L. Lysak and M.K. Hudson, *Lasers and Particle Beams*, **Vol. 5**, Part 2, 351-366 (1987).
  22. "Nonsteady boundary layer flow including ionospheric drag and parallel electric fields," W. Lotko, B.U.O. Sonnerup and R.L. Lysak, *J. Geophys. Res.* **92**, 8635 (1987).
  23. "Making connections between global magnetospheric models and simulations of microscopic plasma processes," R.L. Lysak, in *Modeling Magnetospheric Plasma*, T.E. Moore and J.H. Waite (eds.), AGU Monograph 44, p. 329 (1988).
  24. "Turbulent generation of auroral currents and fields—a spectral simulation of 2-d MHD turbulence," Y. Song and R.L. Lysak, in *Modeling Magnetospheric Plasma*, T.E. Moore and J.H. Waite (eds.), AGU Monograph, p. 197 (1988).
  25. "Theory of auroral zone PiB pulsation spectra," R.L. Lysak, *J. Geophys. Res.* **93**, 5942 (1988).

26. "Microscopic aspects of solar wind-magnetosphere-ionosphere coupling," R.L. Lysak, *Physics of Space Plasmas* (1987), T. Chang, G. Crew, and J. Jasperse (eds.), p. 79 (1988).
27. "Evaluation of twist helicity of FTE flux tubes," Y. Song and R.L. Lysak, *J. Geophys. Res.* **94**, 5273 (1989).
28. "Flux transfer events--the result of three dimensional, time-dependent reconnection," Yan Song and Robert L. Lysak, *Turbulence and Nonlinear Dynamics in MHD Flows*, M. Meneguzzi, A. Pouquet and P.L. Sulem (Editors), Elsevier Science Publications B.V. (North-Holland), p. 75 (1989).
29. "Magnetospheric ULF wave coupling in the dipole model: the impulsive excitation," D.H. Lee and R.L. Lysak, *J. Geophys. Res.* **94**, 17097 (1989).
30. "Current dynamo effect of three-dimensional time-dependent reconnection in the dayside magnetopause," Y. Song and R.L. Lysak, *Geophys. Res. Lett.* **16**, 911 (1989).
31. "Electrodynamic coupling of the magnetosphere and ionosphere," Robert L. Lysak, *Space Sci. Revs.* **52**, 33 (1990).
32. "Formation of flux ropes by turbulent reconnection, R. L. Lysak and Y. Song, *Physics of Magnetic Flux Ropes*, C. T. Russell, E. R. Priest and L. C. Lee (eds), American Geophysical Union, Washington, p. 525 (1990).
33. "The current dynamo effect and its statistical description," Y. Song and R. L. Lysak, *Physics of Magnetic Flux Ropes*, C. T. Russell, E. R. Priest, and L. C. Lee (eds), American Geophysical Union, Washington, p. 533 (1990).
34. "Effects of azimuthal asymmetry on ULF waves in the dipole magnetosphere," Dong-Hun Lee and Robert L. Lysak, *Geophys. Res. Lett.* **17**, No. 1, 53 (1990).
35. "Feedback instability of the ionospheric resonant cavity," R. L. Lysak, *J. Geophys. Res.* **96**, 1553 (1991).
36. "Impulsive excitation of ULF waves in the three-dimensional dipole model: initial results," D.H. Lee and R.L. Lysak, *J. Geophys. Res.* **96**, 3479 (1991).
37. "Monochromatic ULF wave excitation in the dipole magnetosphere," D.H. Lee and R.L. Lysak, *J. Geophys. Res.* **96**, 5811 (1991).
38. "Response of the dipole magnetosphere to pressure pulses," R.L. Lysak and D.-H. Lee, *Geophys. Res. Lett.* **19**, 937 (1992).
39. "Fast ionospheric feedback instability and substorm onset," R.L. Lysak, Y. Song and J. Grieger, *Substorms 1*, European Space Agency publication ESA-SP-335, p. 231 (1992).
40. "Solar wind/magnetospheric dynamos: MHD-scale collective entry of solar wind energy, momentum and mass into the magnetosphere, Y. Song and R.L. Lysak, *Substorms 1*, European Space Agency publication ESA-SP-335, p. 149 (1992).
41. "Anomalous resistivity due to weak double layers: a model for auroral arc thickness," M. Prakash and R.L. Lysak, *Geophys. Res. Lett.* **19**, 2159 (1992).
42. "Waves generated in the vicinity of an argon plasma gun in the ionosphere," L.J. Cahill, Jr., R.L. Arnoldy, R.L. Lysak, W. Peria, and K.A. Lynch, *J. Geophys. Res.* **98**, 9483 (1993).
43. *Auroral Plasma Dynamics*, R.L. Lysak (ed.), American Geophysical Union Monograph, **80** (1993).
44. "Generalized model of the ionospheric Alfvén resonator," R.L. Lysak, *Auroral Plasma Dynamics*, R.L. Lysak (ed.), AGU Monograph, **80**, p. 121 (1993).

45. "Generation of ULF waves by fluctuations in the magnetopause position," R.L. Lysak, Y. Song, and D.-H. Lee, *Solar Wind Sources of Magnetospheric ULF Waves*, M. Engebretson and K. Takahashi (eds.), AGU Monograph, **81**, p. 273 (1994).
46. "Control of the generation of field-aligned current and ULF waves by the magnetic helicity input," Y. Song, R.L. Lysak, and N. Lin, *Solar Wind Sources of Magnetospheric ULF Waves*, M. Engebretson and K. Takahashi (eds.), AGU Monograph, **81**, p. 223 (1994).
47. "Numerical studies on ULF wave structures in the dipole model," D.-H. Lee and R.L. Lysak, *Solar Wind Sources of Magnetospheric ULF Waves*, AGU Monograph, **81**, p. 293 (1994).
48. "Alfvénon, driven reconnection, and the direct generation of field-aligned current," Y. Song and R.L. Lysak, *Geophys. Res. Lett.*, **21**, 1755 (1994).
49. "An MHD simulation study of the poloidal field line resonance in the Earth's dipole magnetosphere," D.Q. Ding, R.E. Denton, M.K. Hudson, and R.L. Lysak, *J. Geophys. Res.*, **100**, 63 (1995).
50. "MHD turbulence in the auroral zone," R.L. Lysak, Y. Song, and J.C. Grieger, *Physics of Space Plasmas (1993)*, MIT Press, Cambridge, MA, p. 115 (1995).
51. "Electron conic acceleration by the ionospheric Alfvén resonator," B.J. Thompson and R.L. Lysak, *Physics of Space Plasmas (1993)*, MIT Press, Cambridge, MA, p. 497 (1995).
52. "Density fluctuations in the auroral ionosphere," M. Prakash and R.L. Lysak, *Physics of Space Plasmas (1993)*, MIT Press, Cambridge, MA, p. 497 (1995).
53. "Coupling of the magnetopause to the ionosphere by means of Alfvén waves and field-aligned currents," R.L. Lysak, Y. Song and J.C. Grieger, *Physics of the Magnetopause*, P. Song, B. Sonnerup and M. Thomsen (eds.), American Geophysical Union, Washington, p. 385 (1995).
54. "MHD mesoscale interactions of the magnetopause and driven reconnection," Y. Song and R.L. Lysak, *Physics of the Magnetopause*, P. Song, B. Sonnerup and M. Thomsen (eds.), American Geophysical Union, Washington, p. 349 (1995).
55. "Electron acceleration by inertial Alfvén waves," B.J. Thompson and R.L. Lysak, *J. Geophys. Res.*, **101**, 5359 (1996).
56. "Modelling mesoscale processes in the global geospace system," M.K. Hudson, W. Lotko, C.A. Cattell, R.L. Lysak, I. Roth and M. Temerin, *Space Science Reviews* **71**: 623-646 (1995).
57. "Effects of ring current disturbances on global MHD oscillations," D.-H. Lee, K.H. Kim, K.W. Min, and R.L. Lysak, *J. Geophys. Res.*, **100**, 19,413 (1995).
58. "On the kinetic dispersion relation for shear Alfvén waves," R.L. Lysak and W. Lotko, *J. Geophys. Res.*, **101**, 5085 (1996).
59. "Coupling of Kelvin-Helmholtz and current sheet instabilities to the ionosphere: a dynamic theory of auroral spirals," R.L. Lysak and Y. Song, *J. Geophys. Res.*, **101**, 15,411 (1996).
60. "Propagation of Alfvén waves through the ionosphere," R.L. Lysak, *Phys. Chem. Earth*, **22**, 757 (1997).
61. "Some theoretical aspects of the solar wind-magnetosphere interaction," Y. Song and R.L. Lysak, *Phys. Chem. Earth*, **22**, 715 (1997).

62. "Field line resonances in discretized magnetospheric models: an artifact study," M. Stellmacher, K.-H. Glassmeier, R.L. Lysak, and M.G. Kivelson, *Ann. Geophysicae*, **15**, 614 (1997).
63. "Comment on 'Theory of nearly perpendicular plasma waves and comparison to Freja satellite measurements,' by C.E. Seyler and J.-E. Wahlund," R.L. Lysak, *J. Geophys. Res.*, **103**, 7043 (1998).
64. "The relationship between electrostatic shocks and kinetic Alfvén waves," R. L. Lysak, *Geophys. Res. Lett.*, **25**, 2089 (1998).
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