



Lee, Lou-Chuang Distinguished Visiting Chair / Academician

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Spacilty : Space Physics

[Education]

- Ph. D. Physics, California Institute of Technology, 1975
- M. S. Physics, California Institute of Technology, 1972
- B. S. Physics, National Taiwan University, 1969

[Experiences]

Distinguished Visiting Chair, Institute of Earth Sciences, Academia Sinica, 2017.5.1 - until now.

Director, Institute of Earth Sciences, Academia Sinica, 2014.1.1 - 2017.04.30

Acting Director, Institute of Earth Sciences, Academia Sinica, 2013.9.1 - 2013.12.31

Distinguished Research Fellow, Institute of Earth Sciences, Academia Sinica, 2012.10 - 2017.4.30

National Science Council, Minister, 2008.5 - 2012.2.

National Central University, President, 2006.2 - 2008.5.

National Central University, Graduate Institute of Space Science, Professor, 2006.2 - until now.

National Applied Research Laboratories, President, 2003 - 2006.

National Space Organization (NSPO), Chief Scientist, 1997 – 2001; Director, 2001 – 2003.

Ministry of Education, Advisor, 2000 – 2005.

National Cheng Kung University, College of Science, Dean, and Department of Physics, Professor, 1995 – 2001.

University of Alaska, Geophysical Institute and Department of Physics, Professor, 1978 – 1995.

University of Maryland, Institute for Physics Science and Technology, Visiting Assistant Professor, 1977 – 1978.

NASA/Goddard Space Flight Center, Research Associate, 1975 – 1977.

Visiting Professor / Scientist: Tokyo University (1986), University of Maryland (1985, 1987), National Central University (1990), Princeton University (1991), China University of Science and Technology (1990), Nagoya University (1996).

Associate Editor, Journal of Geophysical Research (Space Physics), American Geophysical Union, 1989 – 1991.

Editor-in-Chief, Terrestrial, Atmospheric and Oceanic Sciences (TAO), Chinese Geoscience Union (Taiwan), 1997 – 2001.

Editorial Board Member, Chinese Journal of Geophysics (China), since 2001.

Editor, Journal of Geophysical Research (Space Physics), American Geophysical Union, 2001 – 2005.

[Honors and Awards]

- Japan Toray Science Foundation Fellow, 1986.
- Terris Moore Award in Space Physics, Terris Moore, Boston and University of Alaska, 1987.
- Outstanding Faculty Performance Award, University of Alaska, 1988.
- Fulbright Distinguished Scholar, Institute for Space Research, Dos Campos, Brazil, 1988.
- Honorary Professor, Center for Space Science and Application, Chinese Academy of Sciences (Beijing), 1990.
- International Guest Professor, China University of Science and Technology, Hefei, China, since 1990.
- Emil Usibelli Distinguished Research Award, University of Alaska, 1994.
- Fellow, Foundation of the Advancement of Outstanding Scholarship, Taiwan, 1996-2001.
- Outstanding Achievement Award, National Science Council 1997-1998, 2001-2002.
- Outstanding Performance Award, National Science Council (ROCSAT-1 Project), 1999.
- Fellow, Physical Society of the Republic of China, 2000.
- Academic Award, Ministry of Education, 2001.
- Academician, Academia Sinica, Taiwan, 2002.
- World Technology Awards Finalist, 2003.
- Fellow, World Technology Network, 2003.
- Li Kwoh Ting Chair Professor, National Central University, 2005, 2012.
- Fellow, Meteorological Society of the Republic of China, 2005.
- The Presidential Science Prize (The highest honor in science in Taiwan), 2005.
- Member, The world Academy of Sciences (TWAS), 2006.
- Member, International Academy of Astronautics (IAA), 2007.
- Member, International Academy of Engineering, Russian Academy of Engineering (IAE), 2011.
- Li Kwoh Ting Chair Professor, National Cheng Kung University, 2011.
- Achievement Medal (First Rank), "For promotion of science and technology in Taiwan during his tenure as Minister of National Science Council", Executive Yuan, Taiwan, 2012.
- Distinguished Lecture, at Asia Oceania Geosciences Society (AOGS) Annual Meeting in Brisbane, 2013.
- Subramanyan Chandrasekhar Prize of Plasma Physics, Association of Asia-Pacific Physical Societies (AAPPS), 2017.
- 第 19 屆科技管理獎, Chinese Society for Management of Technology, 2017.
- Elected Foreign Member of the US National Academy of Engineering (NAE), 2018.

Introduce

Professor Lou-Chuang Lee was born on April 20, 1947. He received a B.S. degree in physics from National Taiwan University in 1969, and M.S. and Ph.D. degrees in physics from the California Institute of Technology in 1972 and 1975, respectively. He specializes in space science and plasma physics. From 1975 to 1995, he performed advanced research at the NASA/Goddard Space Flight Center and served as a professor at the University of Maryland and University of Alaska. Upon returning to Taiwan in 1995, Prof. Lee joined the faculty of Department of Physics at the National Cheng Kung University, and also served as the Dean of the College of Science. He was appointed the chief scientist at National Space Program Office in 1997, and made director of National Space Program Office in 2001.

Since that time he has led the science and engineering teams implementing the FORMOSAT-2 and FORMOSAT-3 programs. He became the first President of the National Applied Research Laboratories in 2003 and the President of National Central University in 2006. In 2008, he was appointed as the Minister of National Science Council. He was a distinguished research fellow of Institute of Earth Sciences, Academia Sinica from 2012 to 2017. He is currently a Distinguished Visiting Chair of Academia Sinica.

Prof. Lee is a well-known space physicist. He has published more than 300 scientific papers as well as three academic monographs. During his career, Prof. Lee developed several new theories to explain observed space phenomena. His major research achievements include: (a) the turbulence spectrum of interstellar medium, (b) the cyclotron maser theory for the generation of auroral kilometric radiation, (c) the multiple X-line reconnection model for magnetic flux transfer events, (d) the formation mechanism of solar prominences, (e) a new mechanism for solar coronal heating, and (f) the discovery of "gigantic jets" in the Earth's upper atmosphere.

Prof. Lee has received many international as well as national awards, including the Toray Science Foundation Fellow, the Terris Moore Award in space physics, the Outstanding Faculty Performance Award, the Fullbright Scholar Award, the Emil Usibelli Distinguished Research Award, the Foundation for the Advancement of Outstanding Scholarship Award, the Ministry of Education's Outstanding Academic Award, the Presidential Science Prize (The highest honor in science in Taiwan), Subramanyan Chandrasekhar Prize of Plasma Physics (AAPPS, 2017), Academician of Academia Sinica, elected member of The World Academy of Sciences (TWAS), elected member of International Academy of Astronautics (IAA), elected member of International Academy of Engineering, Russian Academy of Engineering (IAE), and elected foreign member of the US National Academy of Engineering (NAE), 2018.

Publications

1. Jokipii, J. R., and L. C. Lee, Velocity of the solar wind as determined from interplanetary scintillations, **Astrophys. J.**, **172**, 729, 1972.
2. Jokipii, J. R., and L. C. Lee, On the relation between the pattern and wind velocity in interplanetary scintillations, **Astrophys. J.**, **182**, 317, 1973.
3. Lee, L. C., Wave propagation in a random medium: A complete set of the moment equations with different wave numbers, **J. Math. Phys.**, **15**, 1431, 1974.
4. Jokipii, J. K., and L. C. Lee, An effect of cosmic rays on the distant solar wind, Solar Wind III, Proceedings of the Third Conference, Pacific Grove, Calif., March 25-29, 1974. (A75-28001 12-92) Los Angeles, University of California, 1974, p. 224-229.
5. Lee, L. C., and J. R. Jokipii, Strong scintillations in astrophysics, I. The Markov approximation, its validity and application to angular broadening, **Astrophys. J.**, **196**, 699, 1975.
6. Lee, L. C., and J. K. Jokipii, Strong scintillations in astrophysics, II. A theory of temporal broadening of pulses, **Astrophys. J.**, **201**, 532, 1975.
7. Lee, L. C., and J. R. Jokipii, Strong scintillations in astrophysics, III. The fluctuations in intensity, **Astrophys. J.**, **202**, 349-453, 1975.
8. Lee, L. C., Strong scintillations in astrophysics, IV. Cross-correlation between different frequencies and

- finite bandwidth effects, **Astrophys. J.**, **206**, 744-752, 1976.
9. Lee, L. C., and J. R. Jokipii, The irregularity spectrum in interstellar space, **Astrophys. J.**, **206**, 735-743, 1976.
 10. Lee, L. C., Plasma irregularities in the comet's tail, **Astrophys. J.**, **210**, 254-275, 1976.
 11. Lee, L. C., Theory of thin screen scintillations for a spherical wave, **Astrophys. J.**, **218**, 468, 1977.
 12. Freund, H. P., L. C. Lee, C. S. Wu, and D. Dillenburg, Spontaneous synchrotron emission from a plasma with an energetic runaway electron tail, **Phys. Fluids**, **21**, 1502, 1978.
 13. Freund, H. P., L. C. Lee, and C. S. Wu, Spontaneous emission near the electron plasma frequency in a plasma with runaway electron tail, **Phys. Rev. Lett.**, **40**, 1563-1566, 1978
 14. Lee, L. C., C. S. Wu., H. P. Freund, D. Dillenburg, and J. Goedert, Excitation of high-frequency waves with mixed polarization by streaming energetic electrons, **J. Plasma Phys.**, **22**, 277-288, 1979.
 15. Lee, L. C., and Wu, C. S., On small-scale turbulences in cometary tails, **Astrophys. J.**, **228**, 935-938, 1979
 16. Papadopoulos, K., H.P. Freund, and L.C. Lee, Comments on "Nonthermal Emission at the Plasma Frequency," **Phys. Fluids**, **22**, 386, 1979.
 17. Freund, H.P., and L.C. Lee, Induced emission of extraordinary mode radiation in tokamaks, **Phys. Fluids**, **22**, 923-925, 1979.
 18. Wu, C. S., and L. C. Lee, A theory of the terrestrial kilometric radiation, **Astrophys. J.**, **230**, 621-626, 1979.
 19. Kan, J. R., L. C. Lee, and S. -I. Akasofu, Two-dimensional potential double layers and discrete auroras, **J. Geophys. Res.**, **84**, 4305-4315, 1979.
 20. Lee, L. C., and J. R. Kan, Transition layer between two magnetized plasmas, **J. Plasma Phys.**, **22**, 515-524, 1979.
 21. Lee, L. C., and J. R. Kan, A unified kinetic model of the tangential magnetopause structure, **J. Geophys. Res.**, **84**, 6417-6426, 1979.
 22. Kan, J. R., and L. C. Lee, Energy coupling function and solar wind-magnetosphere dynamo, **Geophys. Res. Lett.**, **6**, 577-580, 1979.
 23. Kan, J. R., S. -I. Akasofu, and L. C. Lee, Physical processes for the onset of magnetospheric substorms, in "**Dynamics of the Magnetosphere**," pp. 357-368, ed. by S.-I. Akasofu, D. Reidel Publishing Company, 1979.
 24. Lee, L. C., and J. R. Kan, Field-aligned currents in the magnetospheric boundary layer, **J. Geophys. Res.**, **85**, 37-40, 1980.
 25. Albano, R. K., L. C. Lee, and J. R. Kan, Non-neutral field-aligned current sheet and the auroral electric field, **J. Atmos. Terr. Phys.**, **42**, 317-321, 1980.
 26. Freund, H. P., L. C. Lee, and C. S. Wu, Spontaneous emission of plasma-frequency radiation in tokamaks, **Phys. Fluids**, **23**, 413, 1980.
 27. Kan, J. R., and L. C. Lee, On the auroral double-layer criterion, **J. Geophys. Res.**, **85**, 788-790, 1980.
 28. Lee, L. C., and C. S. Wu, Amplification of radiation near cyclotron frequency due to electron population inversion, **Phys. Fluids**, **23**, 1348-1354, 1980.
 29. Akasofu, S. -I., P. C. Gray, and L. C. Lee, A model of the heliospheric magnetic field configuration, **Planet. Space Sci.**, **28**, 609-615, 1980.
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 31. Lee, L. C., J. R. Kan, and C. S. Wu, Generation of auroral kilometric radiation and the structure of auroral acceleration region, **Planet. Space Sci.**, **28**, 703, 1980.

32. Kan, J. R., and L. C. Lee, Double layer criterion on the altitude of the auroral acceleration region, **Geophys. Res. Lett.**, **7**, 429-432, 1980.
33. Lee, L. C., and J. V. Olson, Kelvin-Helmholtz instability and the variation of geomagnetic pulsation activity, **Geophys. Res. Lett.**, **7**, 777-780, 1980.
34. Kan, J. R., and L. C. Lee, Theory of imperfect magnetosphere-ionosphere coupling, **Geophys. Res. Lett.**, **7**, 633-636, 1980.
35. Kan, J. R., and L. C. Lee, On the mechanisms producing the backscattered and the trapped electrons along auroral field lines, **Planet. Space Sci.**, **28**, 1073-1075, 1980.
36. Lee, L. C., R. K. Albano, and J.R. Kan, Kelvin-Helmholtz instability in the magnetopause-boundary layer region, **J. Geophys. Res.**, **86**, 54-58, 1981.
37. Lee, L. C., and J. R. Kan, Nonlinear ion-acoustic waves and solitons in a magnetized plasma, **Phys. Fluids**, **24**, 430-433, 1981.
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39. Lee, L. C., and J. R. Kan, Auroral double layer, in "Physics of Auroral Arc Formation," **Geophys. Monograph Series**, **25**, AGU, 1981.
40. Akasofu, S. -I., Y. Kamide, J. R. Kan, L. C. Lee, and B. H. Ahn, Power transmission from the solar wind-magnetosphere dynamo to the magnetosphere and to the ionosphere: Analysis of the IMS Alaska meridian chain data, **Planet. Space Sci.**, **29**, 721-730, 1981.
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42. Lee, L. C., Transmission of Alfvén waves through the rotational discontinuity at magnetopause, **Planet. Space Sci.**, **30**, 1127, 1982.
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45. Lee, L. C., and J. R. Kan, Structure of the magnetopause rotational discontinuity, **J. Geophys. Res.**, **87**, 139, 1982.
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49. Lee, L. C., Ion two-stream and modified two-stream instabilities in the magnetic neutral sheet, **Geophys. Res. Lett.**, **9**, 1159-1162, 1982.
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51. Swift, D. W., and L. C. Lee, Rotational discontinuities and the structure of the magnetopause, **J. Geophys. Res.**, **88**, 111-124, 1983.
52. Wagner, J. S., L. C. Lee, C. S. Wu, and T. Tajima, Computer simulation of auroral kilometric radiation, **Geophys. Res. Lett.**, **10**, 483-486, 1983.
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55. Ambrosiano, J. J., L. C. Lee, and D. W. Swift, Simulation of the ion tearing instability in the presence of a background plasma, **J. Geophys. Res.**, **88**, 7860-7866, 1983.
56. Huba, J. D., and L. C. Lee, Short wavelength stabilization of the gradient drift instability due to velocity shear, **Geophys. Res. Lett.**, **10**, 357-360, 1983.
57. Kan, J. R., S. -I. Akasofu, and L. C. Lee, A dynamo theory of solar flares, **Solar Phys.**, **84**, 153-167, 1983.
58. Gao, L. S., N. N. Biswas, L. C. Lee, and K. Aki, Effects of multiple scattering on coda wave in three-dimensional medium, **Pure Appl. Geophys.**, (PAGEOPH), **121**, 3-15, 1983.
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61. Lee, L. C., and Y. C. Kwok, A mechanism for the IPDP pulsations, **J. Geophys. Res.**, **89**, 877-882, 1984.
62. Lee, L. C., and S. -I. Akasofu, A note on the energy transfer from the solar wind to the magnetosphere, **Planet. Space Sci.**, **32**, 1423-1425, 1984.
63. Wagner, J. S., L. C. Lee, C. S. Wu, and T. Tajima, A simulation study of the losscone driven cyclotron maser applied to auroral kilometric radiation, **Radio Sci.**, **19**, 509-518, 1984.
64. Lee, L. C., Theory and computer simulation of auroral kilometric radiation, **Proc. Conf. Achievements of the IMS**, Graz, Austria, 505-509, 1984.
65. Lee, L. C., The structure, stability, wave transmission and energy transfer at the Earth's magnetopause, **Proc. Conf. Achievements of the IMS**, Graz, Austria, p. 505, 1984.
66. Lin, C. S., L. C. Lee, and C. S. Wu, Ion viscous effects on magnetosonic shock, **Annales Geophysicae**, **2**, 377, 1984.
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68. Sun, W., L. C. Lee, and S. -I. Akasofu, An improvement of the Kamide-Richmond-Matsushita scheme for the estimation of the three-dimensional current system, **J. Geophys. Res.**, **90**, 6469-6474, 1985.
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71. Fu, Z. F., and L. C. Lee, Simulation of multiple X-line reconnection at the dayside magnetopause, **Geophys. Res. Lett.**, **12**, 291-294, 1985.
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76. Lee, L. C., Magnetic flux transfer at the Earth's magnetopause, in **Solar Wind - Magnetosphere Coupling**, edited by, Y. Kamide, and J. Slavin, pp. 297- 314, Terra Scientific Publishing Company, Tokyo, 1986.
77. Price, C. P., D.W. Swift, and L. C. Lee, Numerical simulation of nonoscillatory mirror waves at the Earth's magnetosheath, **J. Geophys. Res.**, **91**, 101-112, 1986.
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79. Fu, Z. F., L. C. Lee, and J. D. Huba, A quasi-local theory of the $E \times B$ instability in the ionosphere, **J. Geophys. Res.**, **91**, 3263-3269, 1986.
80. Lee, L. C., and Z. F. Fu, Collisional tearing instability in the current sheet with a low magnetic Lundquist number, **J. Geophys. Res.**, **91**, 3311-3313, 1986.
81. Lee, L. C., and Z. F. Fu, A simulation study of magnetic reconnection: Transition from a fast mode to a slow mode expansion, **J. Geophys. Res.**, **91**, 4551-4556, 1986.
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83. Lee, L. C., C. S. Wu, and X. W. Hu, Increase of ion kinetic temperature across a collisionless shock: 1. A new mechanism, **Geophys. Res. Lett.**, **13**, 209-212, 1986.
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91. Shi, Y., L. C. Lee, and Z. F. Fu, A study of tearing instability in the presence of a pressure anisotropy, **J. Geophys. Res.**, **92**, 12171-12179, 1987.
92. Lanzerotti, L. J., R. D. Hunsucker, D. Rice, L. C. Lee, A. Wolf, C.G. MacLennan, and L.V. Medford, Ionosphere and ground-based response to field-aligned current in the magnetospheric cusp region, **J. Geophys. Res.**, **92**, 7739, 1987.
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100. Huang, L., L. C. Lee, and Y. C. Whang, Magnetohydrodynamic waves and instabilities in the heat conducting solar wind plasma, **Planet. Space Sci.**, **36**, 775, 1988.
101. Lee, L. C., S. Wang, C. Q. Wei, and B. T. Tsurutani, Streaming sausage, kink and tearing instabilities in a current sheet with applications to the Earth's magnetotail, **J. Geophys. Res.**, **93**, 7354-7365, 1988
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