

CURRICULUM VITAE - JOSEPH V. HOLLWEG, Ph.D.

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(31 August 2009)  
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PLACE OF BIRTH: New York City, New York

CITIZENSHIP: USA

EDUCATIONAL BACKGROUND:

Graduate: Massachusetts Institute of Technology, Cambridge, Massachusetts; Ph.D. in Plasma Physics and Space Science, February 1968.

Dissertation: A statistical analysis of the scattering of radio waves by an anisotropically turbulent, non-homogeneous solar corona.

Fellowship: Howard Hughes Doctoral Fellowship (Hughes Aircraft Company).

Graduate: Massachusetts Institute of Technology, Cambridge, Massachusetts; M.S. in Aeronautics and Astronautics, June 1965.

Dissertation: Acoustical and electrothermal Hall instabilities in slightly ionized seeded plasma.

Fellowship: National Science Foundation Cooperative.

Undergraduate: Massachusetts Institute of Technology, Cambridge, Massachusetts; B.S. in Aeronautics and Astronautics, June 1965.

Scholarship: Ed Sullivan Scholarship (1960-1964).

HONORS:

Henry Webb Salisbury Memorial Award, M.I.T. Department of Aeronautics and Astronautics, June 1964.

Wayne B. Nottingham Prize, APS Physical Electronics Conference, 1967 (for a paper entitled "Electron Reflection Coefficient at Zero Energy I: Experiments").

Publication Prize, National Center for Atmospheric Research, 1974 (Honorable Mention) (for a paper entitled "Large-Amplitude Hydromagnetic Waves", with A. Barnes).

James Arthur Prize for Solar Physics, Harvard-Smithsonian Center for Astrophysics, September 1992.

Editors' Citation for Excellence in Refereeing, Journal of Geophysical Research - Space Physics, Spring 1993.

Fellow of the American Geophysical Union, elected 2002, "for outstanding research on topics throughout the corona and solar wind and for consistently clear elucidation of the fundamental physical processes involved".

Nominated:  
Distinguished Professor Award  
University of New Hampshire  
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EMPLOYMENT:

Current: Emeritus Professor of Physics  
University of New Hampshire  
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Previous: Professor of Physics (June 1980-May 2006)  
Department of Physics  
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Visiting Professor (May 1994 - July 1994)  
Centre for Plasma Astrophysics  
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Guest Scientist (February 1988 - April 1988)  
Department of Applied Mathematics  
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Research Associate (September 1967 - June 1968)  
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Member of Technical Staff (June - September 1966;  
June - August 1965)  
Hughes Aircraft Company Research Labs  
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## STUDENT RESEARCH:

1970-1972: Alan Wray (graduate student at California Institute of Technology); for two years I was principal supervisor of his Ph.D. thesis research on nonlinear MHD waves: the Ph.D. was awarded after I left Caltech

1982: Bruce Gordon (graduate student at UNH); research on MHD surface waves resulting in a 1983 publication in the *Astrophysical Journal*

1987: Walter Johnson (graduate student at UNH); research on a turbulence-driven solar wind model resulting in a 1988 publication in the *Journal of Geophysical Research*

1983-1987: Alphonse Sterling (graduate student at UNH); supervised Ph.D. thesis research on solar spicules and fibrils leading to the Ph.D. in Physics and three (1984, 1988, 1989) publications in the *Astrophysical Journal* and *Astrophysical Journal Letters*

1986-1992: Guang Yang (graduate student at UNH); supervised Ph.D. thesis research on resonance absorption of MHD waves leading to the Ph.D. in Physics and three (1988, 1990, 1991) publications in the *Journal of Geophysical Research* and the *Astrophysical Journal*.

1991-1995: Venku Jayanti (graduate student at UNH); supervised Ph.D. thesis research on parametric instabilities of Alfvén waves in the presence of streaming alpha particles.

1999-2002: Edisher Kaghashvili (graduate student at UNH); supervised Ph.D. thesis research on MHD wave propagation in non-uniform media with velocity shear, and interaction of solar wind alpha particles with large-amplitude Alfvén waves; this research was co-supervised with Prof. Bernard Vasquez.

PUBLICATIONS:

1. Heil, H. and J.V. Hollweg 1967: Electron reflection coefficient at zero energy, 1. Experiments, Phys. Rev., 164, 881-886.
2. Hollweg, J.V. 1968: A statistical ray analysis of the scattering of radio waves by the solar corona, Astron. J., 73, 972-982.
3. Hollweg, J.V. 1968: Solar coronal effects on pulsar signals, Nature, 220, 771-772.
4. Hollweg, J.V. and J.V. Harrington 1968: Properties of solar wind turbulence deduced by radio astronomical measurements, J. Geophys. Res., 73, 7221-7230.
5. Hollweg, J.V. 1968: Interaction of the solar wind with the moon and formation of a lunar limb shock wave, J. Geophys. Res., 73, 7269-7276.
6. Bracewell, R.N., V.R. Eschleman, and J.V. Hollweg 1969: The occulting disc of the sun at radio wavelengths, Astrophys. J., 155, 367-368.
7. Hollweg, J.V. 1969: Stochastic heating of protons by fast hydromagnetic wave, J. Geophys. Res., 74, 2899-2907.
8. Hollweg, J.V. 1970: Lunar conducting islands and formation of a lunar limb shock wave, J. Geophys. Res., 75, 1209-1216.
9. Jokipii, J.R. and J.V. Hollweg 1970: Interplanetary scintillations and the structure of solar-wind fluctuations, Astrophys. J., 160, 745-753.
10. Hollweg, J.V. and H.J. Volk 1970: Two new plasma instabilities in the solar wind, Nature, 225, 441-443.
11. Hollweg, J.V. 1970: Collisionless solar wind, 1. Constant electron temperature, J. Geophys. Res., 75, 2403-2418.
12. Hollweg, J.V. 1970: Angular broadening of radio sources by solar wind turbulence, J. Geophys. Res., 75, 3715-3727.
13. Hollweg, J.V. 1970: Fluctuations in times of arrival of pulsar pulses, Astrophys. J., 161, L225-L231.
14. Hollweg, J.V. and H.J. Volk 1970: New plasma instabilities in the solar wind, J. Geophys. Res., 75, 5297-5309.
15. Hollweg, J.V. and H.J. Volk 1971: Energy and momentum exchange in transverse electromagnetic waves, J. Geophys. Res., 76, 7527-7541.
16. Hollweg, J.V. 1971: Density fluctuations driven by Alfvén waves, J. Geophys. Res., 76, 5155-5161.
17. Hollweg, J.V. 1971: Nonlinear Landau damping of Alfvén waves, Phys. Rev. Letters, 27, 1349-1352.
18. Hollweg, J.V. 1971: Collisionless solar wind, 2. Variable electron temperature, J. Geophys. Res., 76, 7491-7502.
19. Hollweg, J.V. 1972: Supergranulation-driven Alfvén waves in the solar chromosphere, and related phenomena, Cosmic Electrodynamics, 2, 423-444.

20. Hollweg, J.V. and J.R. Jokipii 1972: Wavelength dependence of the inter-planetary scintillation index, 494-496. in Proceedings of the 1971 Solar Wind Conference (C.P. Sonett, P.J. Coleman, Jr., and J.M. Wilcox, eds.), NASA.
21. Hollweg, J.V. 1972: Comments on the effects of supergranulation-driven Alfvén waves in the solar wind, *Ibid*, 223-226.
22. Hollweg, J.V. 1972: Comments on density fluctuations in the solar wind, *Ibid*. 503-505.
23. Hollweg, J.V. and J.R. Jokipii 1972: Heat conduction in a turbulent magnetic field with application to solar wind electrons, *J. Geophys. Res.*, 77, 3311-3316.
24. Hollweg, J.V. 1972: Alfvénic motions in the solar atmosphere, *Astrophys. J.*, 177, 255-259.
25. Hollweg, J.V. 1973: Alfvén waves in a two-fluid model of the solar wind, *Astrophys. J.*, 181, 547-566.
26. Hollweg, J.V. 1973: Alfvén waves in the solar wind: Wave pressure, Poynting flux, and angular momentum, *J. Geophys. Res.*, 78, 3643-3652.
27. Hollweg, J.V. 1974: Alfvénic acceleration of solar wind helium and related phenomena. 1. Theory, *J. Geophys. Res.*, 79, 1357-1363.
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29. Hollweg, J.V. 1974: Improved limit on photon rest mass, *Phys. Rev. Lett.*, 32, 961-962.
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33. Hollweg, J.V. 1975: Hydromagnetic waves in interplanetary space, *P.A.S.P.*, 86, 561-594.
34. Hollweg, J.V. 1975: Alfvén wave refraction in high-speed solar wind streams, *J. Geophys. Res.*, 80, 908-916.
35. Hollweg, J.V. and G. Skadron 1975: Fokker-Planck theory for cosmic ray diffusion in the presence of Alfvén waves, 1. Theory, *J. Geophys. Res.*, 80, 2701-2707.
36. Hollweg, J.V. 1976: Collisionless electron heat conduction in the solar wind, *J. Geophys. Res.*, 81, 1649-1658.
37. Chang, S.C. and J.V. Hollweg 1976: Alfvénic acceleration of solar wind helium, 2. Model calculations, *J. Geophys. Res.*, 81, 1659-1663.
38. Hollweg, J.V. and D.F. Smith 1976: Current-driven Alfvén instability, *J. Plasma Physics*, 15, 245-252.

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46. Hollweg, J.V. 1978: Some physical processes in the solar wind, *Rev. Geophys. Space Phys.*, 16, 689-720.
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49. Nye, A., and J.V. Hollweg 1980: Alfvén waves in sunspots, *Solar Phys.*, 68, 279-295.
50. Querfeld, C., and J.V. Hollweg 1980: Search for coronal Alfvén waves, *Bull. Amer. Astron. Soc.*, 10, 431.
51. Edenhofer, P., M.K. Bird, H. Volland, and J.V. Hollweg 1980, *Indirekte Beobachtungen magnetohydrodynamischer Wellenaktivität in der Sonnenkorona*, *Mitt. Astron. Ges.*, 50, 42-45.
52. Hollweg, J.V. 1981: Cosmic Rays: Solar system effects, *Encyclopedia of Physics*, 158-160.
53. Hollweg, J.V. 1981: Helium and heavy ions, *Proceedings of the 4th Solar Wind Conference*, Burghausen, Report MPAE-W-100-81-31, ed. by H. Rosenbauer, 414-424.
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55. Hollweg, J.V. 1981: Heating of the solar wind, in *The Sun*, ed. by S. Jordan, NASA-SP-405, 355-372.

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66. Hollweg, J.V. 1982: Heating of the corona and solar wind by switch-on shocks, *Astrophys. J.*, 254, 806-813.
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69. Isenberg, P.A., and J.V. Hollweg 1983: On the preferential acceleration and heating of solar wind heavy ions, *J. Geophys. Res.*, 88, 3923-3935.
70. Hollweg, J.V. 1983: Coronal heating by waves, in *Solar Wind Five*, ed. by M. Neugebauer, 5-21.
71. Hollweg, J.V. 1984: Resonances of coronal loops, *Astrophys. J.*, 277, 392-403.
72. Hollweg, J.V. 1984: Alfvénic resonant cavities in the solar atmosphere, simple aspects, *Solar Phys.*, 91, 269-288.
73. Sterling, A., and J.V. Hollweg 1984: Alfvénic resonances on solar spicules, *Astrophys. J.*, 285, 843-850.
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75. Hollweg, J.V., and A.C. Sterling 1984: Resonant heating: an interpretation of coronal loop data, *Astrophys. J. Letters*, 282, L31-L33.
76. Hollweg, J.V. 1985: Alfvén Waves, *McGraw-Hill Encyclopedia of Science and Technology*.
77. Hollweg, J.V. 1985: Alfvénic heating of the chromosphere and corona, in *Proc. Sac Peak Chromospheric Workshop*, ed. by B. Lites, National Solar Observatory, 235-251.
78. Mariska, J.T., and J.V. Hollweg 1985: Alfvénic pulses in the solar atmosphere, *Astrophys. J.*, 296, 746-757.
79. Hollweg, J.V. 1985: Viscosity in a magnetized plasma: physical interpretation, *J. Geophys. Res.*, 90, 7620-7622.
80. Hollweg, J.V. 1986: Transition region, corona, and solar wind in coronal holes, *J. Geophys. Res.*, 91, 4111-4125.
81. Hollweg, J.V. 1986: Energy and momentum transport by waves in the solar atmosphere, in "Advances in Space Plasma Physics", ed. by B. Buti, World Scientific, Singapore, 77-141.
82. Hollweg, J.V. 1986: Viscosity and the CGL equations in the solar corona, *Astrophys. J.*, 306, 730-739.
83. Nocera, L., E.R. Priest, and J.V. Hollweg 1986: Nonlinear development of phase-mixed Alfvén waves, *Geophys. Astrophys. Fluid Dyn.*, 35, 111-129.
84. Hollweg, J.V. 1986: Resonance absorption of MHD surface waves: physical discussion, *Ap. J.*, 312, 880-885.
85. Hollweg, J.V. 1987: Resonance absorption of MHD surface waves: viscous effects, *Ap. J.*, 320, 875-883.
86. Hollweg, J.V. 1987: Incompressible MHD surface waves: nonlinear aspects, *Ap. J.*, 317, 918-925.
87. Hollweg, J.V. 1987: Small-scale MHD wave processes in the solar atmosphere and solar wind, *Proc. 21st ESLAB Symposium, ESA-SP-275*, pp. 161-168.
88. Sterling, A.C., and J.V. Hollweg 1988: The rebound shock model for solar spicules: dynamics at long times, *Ap. J.*, 327, 950-963.
89. Hollweg, J.V., and G. Yang 1988: Resonance absorption of MHD waves at thin surfaces, *J. Geophys. Res.*, 93, 5423-5436.
90. Hollweg, J.V. and W. Johnson 1988: Transition region, corona, and solar wind in coronal holes: some 2-fluid models, *J. Geophys. Res.*, 93, 9547-9554.
91. Hollweg, J.V. 1988: Resonance absorption of solar p-modes by sunspots, *Ap. J.*, 335, 1005-1014.
92. Hollweg, J.V. 1988: Coronal heating: Theoretical ideas, *Proc. IAU General Assembly*.
93. Sterling, A.C., and J.V. Hollweg 1989: A rebound shock mechanism for solar fibrils, *Ap. J.*, 343, 985-993.

94. Hollweg, J.V., and M.A. Lee 1989: Slow twists of solar magnetic flux tubes and the polar magnetic field of the sun, *Geophys. Res. Lett.*, 16, 919-922.
95. Hollweg, J.V. 1990: Resonance absorption of propagating fast waves in a cold plasma, *Planetary Space Sci.*, 38, 1017-1030.
96. Hollweg, J.V., G. Yang, V. Cadez and B. Gakovic 1990: Surface waves in an incompressible fluid: resonant instability due to velocity shear, *Ap. J.*, 349, 335-344.
97. Hollweg, J.V. 1990: Resonant decay of global MHD modes at 'thick' interfaces, *J. Geophys. Res.*, 95, 2319-2324.
98. Hollweg, J.V. 1990: MHD waves on solar magnetic flux tubes: a tutorial review, in *The Physics of Magnetic Flux Ropes*, ed. by C.T. Russell, AGU Geophysical Monograph 58, 23-31.
99. Hollweg, J.V. 1990: Heating of the solar corona, *Computer Phys. Reports*, 12, 205-232.
100. Hollweg, J.V. 1990: On WKB expansions for Alfvén waves in the solar wind, *J. Geophys. Res.*, 95, 14873-14880.
101. Sakurai, T., M. Goossens, and J.V. Hollweg 1991: Resonant behavior of MHD waves on magnetic flux tubes 1. connection formulae at the resonant surfaces, *Solar Phys.*, 133, 227-245.
102. Sakurai, T., M. Goossens, and J.V. Hollweg 1991: Resonant absorption of waves by magnetic flux tubes 2. absorption of sound waves by sunspots, *Solar Phys.*, 133, 247-262.
103. Yang, G., and J.V. Hollweg 1991: The effects of velocity shear on the resonance absorption of MHD surface waves: cold plasma, *J. Geophys. Res.*, 96, 13807-13813.
104. Hollweg, J.V. 1991: Cosmic rays: solar system effects, in *Encyclopedia of Physics (2nd Edition)*, ed. by R.G. Lerner and G.L. Trigg, VCH Publishers, New York, pp.198-200.
105. Hollweg, J.V. 1991: Alfvén waves, in "Mechanisms of Chromospheric and Coronal Heating", ed. by P. Ulmschneider, E.R. Priest and R. Rosner, Springer-Verlag, Berlin, pp. 423-434.
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107. Hollweg, J.V. 1992: Wave-particle interactions in the solar wind, in *The Astronomy and Astrophysics Encyclopedia*, ed. by S.P. Maran, Van Nostrand Reinhold, New York, 338-340.
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111. Hollweg, J.V., R. Esser, and V. Jayanti 1993: Modulational and decay instabilities of Alfvén waves: effects of streaming  $\text{He}^{++}$ , J. Geophys. Res., 98, 3491-3500.
112. Jayanti, V., and J.V. Hollweg 1993: On the dispersion relations for parametric instabilities of parallel-propagating Alfvén waves, J. Geophys. Res., 98, 13247-13252.
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121. Vasquez, B. J., and J. V. Hollweg 1996: Formation of arc-shaped Alfvén waves and rotational discontinuities from oblique linearly polarized wave trains, J. Geophys. Res., 101, 13527-13540.
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