

## VITA: Wick C. Haxton

*Birth:* August 21, 1949, Santa Cruz, California      *Citizenship:* U.S.  
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*Family:* Laura K. Haxton (wife)      Daniel James and Thomas Kirk (sons)

### Education

University of California, Santa Cruz, 1967-71  
B.S. in Physics and in Mathematics with highest honors and College honors  
Stanford University, 1971-75  
M. S. (1973), Ph.D. (1976) Thesis: Semi-leptonic Weak Interactions

### Current Positions

Professor of Physics, University of California, Berkeley, 2009-  
Faculty Senior Scientist, Lawrence Berkeley National Laboratory, 2009-  
Associate Senior Fellow, Institute for Nuclear Theory, 2009-  
Emeritus Professor, University of Washington, 2009-

### Former Positions

Postdoctoral Research Associate, Institut für Kernphysik der Universität Mainz, 1975-77  
Postdoctoral Staff Member, J.R. Oppenheimer Fellow, and Staff Member, Los Alamos  
Scientific Laboratory, 1977-85  
Assistant Professor of Physics, Purdue University, 1980-81  
Associate Professor of Physics, University of Washington, 1984-87  
Professor of Physics, University of Washington, 1987-2009  
Director, National Institute for Nuclear Theory, 1991-2006; Senior Fellow, 2006-  
Adjunct Professor Astronomy, University of Washington, 1994-2009

### Research Interests

Electroweak interactions with nuclei and tests of conservation laws (lepton number and  
double beta decay, parity, family number, time reversal)  
Neutrino physics and astrophysics  
Nuclear astrophysics  
Underground science  
Many-body techniques in nuclear, atomic, and condensed matter physics

### Recognition, Fellowships

Member, National Academy of Sciences, 1999-  
Fellow, American Academy of Arts and Sciences, 1999-  
Fellow, American Association for the Advancement of Science, 1988-  
Inaugural Member, Washington State Academy of Sciences, 2008-  
Fellow, American Physical Society, 1987-  
Miller Fellow, UC Berkeley, 2000-2001  
Bethe Lecturer, Cornell University, 2000-2001  
Guggenheim Fellow, 2000-2001  
American Physical Society Hans Bethe Prize, 2004

## **Professional Activities**

### *American Physical Society*

Vice-Chair/Chair-Elect/Chair, Division of Nuclear Physics, 1991-93  
Vice-Chair/Chair-Elect/Chair, Division of Astrophysics, 1994-97  
Councillor-at-large, 1991-95  
Chair-Elect/Chair, APS Nominations Committee, 1997-98  
Division Councillor, APS Division of Nuclear Physics, 2010-  
APS Task Force on Publication (Merzbacher Committee), 1997-98  
APS Task Force on Prizes and Awards (Dresselhaus Committee), 1997-98; (Sarachik Committee), 2001  
Division of Nuclear Physics Committees  
Fellowship Committee (Chair), 1994  
Executive Committee, 1989-94  
Nominations Committee, 1989  
Bonner Prize Committee (Chair), 1987-88  
Nuclear Science Resources Committee, 1987-1991  
Physics News 1988 Committee (Chair)  
Program Committee, 1982-84  
Division of Astrophysics Committees  
Executive Committee, 1994-97  
Program Committee (Chair), 1996  
Fellowship Committee (Chair), 1995  
Bethe Prize Committee, 1998-2000  
Bethe Prize Funding Committee (Co-Chair), 1995-97

### *National Academy of Sciences/National Research Council*

Member, Board on Physics and Astronomy, NAS, 2005-9  
Chair, Nuclear Physics Panel, 2004-8  
Physics Section Representative, Class Membership Committee, 2010-  
NRC Committee on Nuclear Physics, 1996-98  
NRC Physics Survey Overview Committee, 1998-2001  
Rare Isotope Science Assessment Committee, National Research Council, 2005-06  
Astro2010 Panel on Cosmology and Fundamental Physics, 2009-2010  
Theory/Laboratory Astrophysics Panel, Astronomy and Astrophysics Survey, 1990-92

### *IUPAP*

IUPAP, Particle and Nuclear Astrophysics and Gravitation Int. Committee, 1997-2004  
Associate Member, C12, IUPAP, 2002-04

### *Other*

Member-at-large, Section Committee (Physics), Am. Assoc. Advancement Science, 1990-94  
Organizing Committee, National Summer School in Nuclear Physics, 1987-95  
P.I., National Summer School in Nuclear Physics, 1995-

### **Editorial Activities**

Editor, Physics Letters B, 1995-  
Editorial Board Member, Annual Reviews of Nuclear and Particle Physics, 2007-2008;  
Associate Editor, 2009-  
Editorial Board Member, Progress in Particle and Nuclear Physics, 1999-2005  
Editorial Board Member, Atomic Data and Nuclear Data Tables, 1998-  
U.S. Managing Editor, Reports on Nuclear Physics (Int. J. Mod. Phys. E), 1993-95  
Editorial Board, Modern Physics Letters A, 1986-91; Journal of Modern Physics A, 1987-91  
Advisory Committee, Physics Today, 1991-95

### **Representative Agency Service**

DOE Early Career Panel, 2010  
Various DOE Office of Nuclear Physics Review Panels, 1990-present  
NSF Physics Division Young Investigator Panel, 1993 (Chair)  
NSERC Grant Selection Committee, 1989-92  
NSAC Theory Subcommittee, 1987-88  
NSF Theoretical Physics Review Committee, 1987

### **Advisory Committees**

FRIB Theory Users Organization, 2010- (Chair)  
FRIB Scientific Advisory Committee, 2009-  
Advisory Board, UCSD Center for Astrophysics and Space Sciences, 2008-  
Dean's Committee, Laboratory for Nuclear Science, MIT, 1999-2003  
Physics Division, Oak Ridge National Laboratory, 1998-2002  
Physics Directorate and N-Division Advisory Committees, Lawrence Livermore National  
Laboratory, 1997-2004 (Chair, PDAC, 2000-01 )  
Physics Division Review Committee, Argonne National Laboratory, 1996-2001  
(Chair, 2000-01)  
TRIUMF Physics Advisory Committee, 1997-2003  
Visiting Committee, Physics, Brookhaven National Laboratory, 1996-97; 2000-05  
Advisory Committee, Oak Ridge Radioactive Beams Facility, 1994-97  
Advisory Committee, LBNL Nuclear Science Division 1993-97; Chair, 1997  
CEBAF Physics Advisory Committee, 1993-97  
Advisory Board, Institute for Theoretical Physics (Santa Barbara), 1993-95  
MSU Superconducting Cyclotron Laboratory Physics Advisory Committee, 1992-96  
Advisory Committee, IUCF and Indiana University Nuclear Theory Group, 1988-94  
Board of Directors, LAMPF, 1988-1990  
Theoretical Division External Advisory Committee, Los Alamos, 1987-93, 2001-  
Advisory Committee, TUNL, 1987-1993  
Physics Advisory Committee, Los Alamos Meson Physics Facility, 1984-87; Chairman,  
Neutrino Subcommittee, 1986; Chairman, Electroweak Committee, 1987

## **Workshop and School Organization**

### *General Conferences, Workshops, REU Programs*

- Workshops on Nuclear and Particle Astrophysics, American Astronomical Society annual meeting, Boston, May, 2011 (chair)
- Director, University of Washington Research Experiences for Undergraduates Program, 1994-2003; co-Director 2007-2009
- Carolina International Symposium on Neutrino Physics, 2008 (Co-organizer)
- TAUP 2003: Eighth International Workshop on Topics in Astroparticle and Underground Physics, Seattle, September 2003 (Chair)
- ITP Program on Neutrinos: Data, Cosmos, and the Planck Scale, January-May, 2002 (Co-organizer)
- Aspen Workshop on Underground Science, May-June, 2002 (Co-organizer)
- Neutrino Workshop, Seattle, September 2000 (Co-chair)
- Carolina Symposium on Neutrino Physics, March, 2000 (Co-chair)
- ITP Conference on Solar Neutrinos, Santa Barbara, December 2-6, 1997 (Chair)
- APS DNP Workshop on Symmetries, Whistler, October 1997 (Co-chair)
- ITAMP/INT Workshop on Tritium beta Decay, May 1996 (Co-chair)
- Workshop on Science Underground, Sept. 27-Oct. 1, 1982, Los Alamos (Chair)

### *Institute for Nuclear Theory Program Organization*

- Extreme Computing: Nuclear Physics/Applied Mathematic/Computer Science Interface, Summer, 2011
- Long Baseline Neutrino Physics and Astrophysics, Summer 2010
- Neutrino Response Functions from Threshold to 10 GeV, August 2006
- Effective Field Theories and Effective Interactions, Summer 2000
- Fundamental Symmetries in Nuclei, Spring 1992
- Electron Scattering and Few-Body Systems, Winter/Spring 1991
- Nuclear Astrophysics, Summer 1990

### *Institute for Nuclear Theory Workshop Organization*

- Summer School on Nuclear and Particle Astrophysics, June-July, 2009
- Solar Fusion Cross Sections for the pp Chain and CNO Cycle, January, 2009
- 4<sup>th</sup> Argonne/INT/MSU/JINA RIA Workshop, September, 2007
- Solar Nuclear Fusion Rates, February 1997
- The Tritium Beta Decay Spectrum, May 1996
- Relativity in Two- and Few-Body Nuclear Systems, September 1993

### *ECT\* (Trento) Workshop Organization*

- The Origin of the Elements: A Modern Perspective, May 2011 (Co-chair)
- Neutron Stars and Supernovae, June 1996 (Co-chair)

### *National Summer School in Nuclear Physics Organization*

- University of California, Santa Cruz, July 2000
- University of Washington, Seattle, June 1995
- University of California, Santa Cruz, August 1990

### *University of Washington Summer Institute Organization*

- Nuclear Astrophysics, July 15-August 9, 1985
- Symmetries and Weak Interactions, July 10-August 4, 1989

**Research Visits**

Visiting Faculty, Kavli Institute for Theoretical Physics, Santa Barbara, January-March 2003

Visiting Miller Professor, Dept. of Physics, UC Berkeley, January 1 – June 15, 2001

Visiting Bethe Lecturer, Dept. of Physics, Cornell, April 2001

Visiting Scientist, Dept. of Physics, University of Melbourne, December 1, 1992-  
February 28, 1993

Visiting Scientist, Dept. of Physics, Princeton University, Fall Semester, 1983

Visiting Scientist, Inst. Theoretical Physics, Santa Barbara, Summer 1982

## Publications

1. T.W. Donnelly, J. Dubach, and W.C. Haxton. Semileptonic weak and electromagnetic interactions in the Goldhaber-Teller model. *Nucl. Phys. A* **251**, 353 (1975).
2. W.C. Haxton and Remo Ruffini. Absorption and defocusing of electromagnetic radiation by a Schwarzschild Black Hole. *Ann. Phys.* **95**, 1 (1975).
3. W.C. Haxton and T.W. Donnelly. Solar neutrino-induced reactions. *Phys. Lett. B* **66**, 123 (1977).
4. T.W. Donnelly and W.C. Haxton. Neutrino reactions in the Mass-37 system. *Nucl. Phys. A* **287**, 506 (1977).
5. F. Borkowski *et al.* Threshold electroproduction of charged pions from light nuclei. *Phys. Rev. Lett.* **38**, 742 (1977).
6. W.C. Haxton. Threshold pion photoproduction in  $^{12}\text{C}$  and the 15.11 MeV M1 form factor. *Phys. Lett. B* **76B**, 165 (1978).
7. W.C. Haxton. Threshold pion electroproduction and the nuclear response surface. *Nucl. Phys. A* **306**, 429 (1978).
8. J.F. Dubach and W.C. Haxton. Nuclear structure and  $(e, e')$ : The significance of high momentum transfer data and meson exchange currents. *Phys. Rev. Lett.* **41**, 1453 (1978).
9. T.W. Donnelly and W.C. Haxton. Multipole operators in semi-leptonic weak and electromagnetic interactions with nuclei: harmonic oscillator single-particle matrix elements. *Atomic Data and Nuclear Data Tables* **23**, 103 (1979).
10. J. Flanz, R.S. Hicks, R.A. Lindgren, G.A. Peterson, J. Dubach, and W.C. Haxton. Electron scattering, isospin mixing, and the structure of the 12.71 and 15.11 MeV levels in  $^{12}\text{C}$ . *Phys. Rev. Lett.* **43**, 1922 (1979).
11. W.C. Haxton. Pion photoproduction and the optical potential. *Phys. Lett. B* **92**, 37 (1980).
12. W.C. Haxton and Leon Heller. The heavy-quark-antiquark potential in the MIT bag model. *Phys. Rev. D* **22**, 1198 (1980).
13. W.C. Haxton and G. Cowan. Solar neutrino production of long-lived isotopes and secular variations in the Sun. *Science* **210**, 897 (1980).
14. R.M. Sealock, H.S. Caplan, G.J. Lolos, and W.C. Haxton. Low energy angular distributions for the  $^{12}\text{C}(e, \pi^+)e'$  reaction. *Phys. Rev. C* **23**, 1293 (1981).

15. T.W. Donnelly and W.C. Haxton. Multipole operators in semileptonic weak and electromagnetic interactions with nuclei: II. General single-particle matrix elements. *Atomic Data and Nuclear Data Tables* **25**, 1 (1980).
16. W.C. Haxton, B.F. Gibson, and E.M. Henley. Parity nonconservation in  $^{18}\text{F}$ ,  $^{19}\text{F}$ , and  $^{21}\text{Ne}$ . *Phys. Rev. Lett.* **45**, 1677 (1980).
17. W.C. Haxton. Parity nonconservation in  $^{18}\text{F}$  and meson exchange current contributions to the axial charge operator. *Phys. Rev. Lett.* **46**, 698 (1981).
18. W.C. Haxton. The solar neutrino capture cross section for  $^{81}\text{Br}$ . *Nucl. Phys. A* **367**, 517 (1981).
19. W.C. Haxton, G.J. Stephenson, Jr., and D. Strottman. Double beta decay and the Majorana mass of the electron neutrino. *Phys. Rev. Lett.* **47**, 153 (1981).
20. G.A. Cowan and W.C. Haxton. The solar neutrino production of  $^{97}\text{Tc}$  and  $^{98}\text{Tc}$ . *Science* **216**, 51 (1982).
21. W.C. Haxton, G.J. Stephenson, Jr., and D. Strottman. Lepton-number conservation and the double beta decay of  $^{128}\text{Te}$  and  $^{130}\text{Te}$ . *Phys. Rev. D* **25**, 2360 (1982).
22. W. C. Haxton, G. J. Stephenson, Jr., and D. Strottman. Double Beta Decay and Lepton Number Conservation. *Physics News in 1981*, P. Schewe (ed.). AIP (1981).
23. G.A. Cowan and W.C. Haxton. Solar variability, glacial epochs, and the solar neutrino flux. *Los Alamos Science* **3**, No. 2, 46 (1982).
24. W.C. Haxton. Gamow-Teller strength functions and neutrino problems. In *Spin Excitations in Nuclei*, F. Petrovich, G.E. Brown, G.T. Garvey, C.D. Goodman, R.A. Lindgren, and W.G. Love (eds.). Plenum Press, NY, pp. 605-626 (1984).
25. G.A. Cowan and W.C. Haxton. A proposed geological solar neutrino flux measurement. In *Proc. of the 1982 Summer Workshop on Proton Decay Experiments*, Argonne National Laboratory, June 1982 (1982).
26. W.C. Haxton and G.A. Cowan. A proposed geological solar neutrino measurement. In *Science Underground (Los Alamos, 1982)*, M.M. Nieto *et al.* (eds.). AIP Conf. Proc. **96**, pp. 105-108 (1982).
27. W.C. Haxton, S.P. Rosen, and G.J. Stephenson, Jr. Higgs-boson-exchange contributions to neutrinoless double-beta decay. *Phys. Rev. D* **26**, 1805 (1982).
28. W.C. Haxton. Double beta decay. *Comments in Nuclear and Particle Physics* **11**, 41 (1983).

29. W.C. Haxton. Double beta decay. In *McGraw-Hill Yearbook of Science and Technology*. McGraw-Hill, New York, pp. 141-3 (1984).
30. E.G. Adelberger, M.M. Hindi, C.D. Hoyle, and R.D. Von Lintig, and W.C. Haxton. The beta decays of  $^{18}\text{Ne}$  and  $^{19}\text{Ne}$  and their relation to parity mixing in  $^{18}\text{F}$  and  $^{19}\text{F}$ . *Phys. Rev. C* **27**, 2833 (1983).
31. W.C. Haxton and E.M. Henley. Enhanced T-nonconserving nuclear moments. *Phys. Rev. Lett.* **51**, 1937 (1983).
32. W.C. Haxton, G.A. Cowan, and M. Goldhaber. Radiochemical tests of double beta decay. *Phys. Rev. C* **28**, 467 (1983).
33. W.C. Haxton and G.J. Stephenson, Jr. Neutrino masses, right-handed currents, and double beta decay. In *Progress at LAMPF 1983*. (LA-10429-RR)
34. W.C. Haxton and G.J. Stephenson, Jr. Comment on 'Nilsson-pairing model for double beta decay.' *Phys. Rev. C* **28**, 458 (1983).
35. M.M. Gazzaly, N.M. Hintz, M.A. Franey, J. Dubach, and W.C. Haxton. Neutron and proton transition matrix elements for  $^{90}\text{Zr}$  from a microscopic analysis of 0.8 GeV proton inelastic scattering. *Phys. Rev. C* **28**, 294 (1983).
36. W.C. Haxton. Double beta decay: Theory. In *Resonance Ionization Spectroscopy 1984. Second International Symposium on Resonance Ionization Spectroscopy and Its Applications*, G.S. Hurst and M.G. Payne (eds.). IOP, pp. 269-278 (1984).
37. G.A. Cowan, K.S. Daniels, W.C. Haxton, D.V. Rokop, C.N. Treher, and K. Wolfsberg. The Molybdenum Solar Neutrino Experiment," in *Resonance Ionization Spectroscopy 1984, Second International Symposium on Resonance Ionization Spectroscopy and Its Applications*, G.S. Hurst and M.G. Payne (eds.). IOP, pp. 263-267 (1984).
38. W.C. Haxton. Theoretical aspects of double beta decay. In *Fifth Workshop on Grand Unification, Brown University, Providence, RI, April 12-14, 1984*, K. Kang, H. Fried, and P. Frampton (eds.). World Scientific, Singapore, pp. 252-267 (1984).
39. W.C. Haxton. Solar neutrino spectroscopy. In *Intersections Between Particle and Nuclear Physics*, R.E. Mischke (ed.). AIP Conf. Proc. **123**, pp. 1026-1036 (1984).
40. W.C. Haxton. Double beta decay:theory. In *Intersections Between Particle and Nuclear Physics*, R.E. Mischke (ed.). AIP Conf. Proc. **123**, pp. 980-991 (1984).
41. W.C. Haxton. Solar neutrinos: prospects for detection and implications. In *Neutrino Physics and Astrophysics: Proceedings of the 11<sup>th</sup> International Conference, Dortmund, FRG, June 11-16, 1984*, K. Kleinknecht and E.A. Paschos (eds.). World Scientific, pp. 214-228 (1984).



42. W.C. Haxton. New developments in the theory of double beta decay. In *Neutrino Physics and Astrophysics: Proceedings of the 11<sup>th</sup> International Conference, Dortmund, FRG, June 11-16, 1984*, K. Kleinknecht and E.A. Paschos (eds.). World Scientific, pp. 130-144 (1984).
43. W.C. Haxton and G.J. Stephenson, Jr. Double beta decay. *Prog. Part. and Nucl. Phys.* **12**, 409 (1984).
44. K. Wolfsberg, G.A. Cowan, E.A. Bryant, K.S. Daniels, S.W. Downey, W.C. Haxton, V.G. Nielsen, N.S. Nogar, C.M. Miller, and D.J. Rokop. The molybdenum solar neutrino experiment. In *Solar Neutrinos and Neutrino Astronomy*, M.L. Cherry, W.A. Fowler, and K. Lande (eds.). AIP Conf. Proc. 126, pp. 196-202 (1985).
45. J.L. Friar and W.C. Haxton. Current conservation and the transverse electric multipole field. *Phys. Rev. C* **31**, 2027 (1985).
46. W.C. Haxton. Nuclear tests of lepton number and CP conservation. In *Nuclear Shell Models*, M. Vallieres and B.H. Wildenthal (ed.). World Scientific, Singapore, pp. 471-486 (1985).
47. W.C. Haxton. Nuclear structure problems in double beta decay. In *Neutrino Mass and Low Energy Weak Interactions: Proc. of the Conference on Neutrino Mass Miniconference*, V. Barger and D. Cline (eds.). World Scientific, pp. 148-155 (1985).
48. E.G. Adelberger and W.C. Haxton. Parity violation in the nucleon-nucleon interaction. *Ann. Rev. Nucl. Part. Sci.* **35**, 501 (1985).
49. W.C. Haxton. Atomic effects and heavy neutrino emission in beta decay. *Phys. Rev. Lett.* **55**, 807 (1985).
50. W.C. Haxton. The solar neutrino problem and new experiments. In *Current Problems in Nuclear Physics*, T. Paradallis and S. Kassionides (eds.), Hellenic Physical Society Conf. Series 1, pp. 83-99 (1986).
51. W.C. Haxton. The solar neutrino puzzle. *Comm. Nucl. & Part. Phys.* **16**, 95 (1986).
52. S.H. Aronson, H.-Y. Cheng, E. Fischbach, and W.C. Haxton. Experimental signals for hyperphotons. *Phys. Rev. Lett.* **56**, 1342 (1986).
53. W.C. Haxton. Adiabatic conversion of solar neutrinos. *Phys. Rev. Lett.* **57**, 1271 (1986).
54. G.A. Cowan *et al.* The molybdenum solar neutrino experiment. In *'86 Massive Neutrinos in Astrophysics and in Particle Physics: Proceedings of the Sixth Moriond Workshop, Tignes, Savoie, France, January 25-February 1<sup>st</sup>, 1986*, O. Fackler and J. Trân Thanh Vân (eds.). Gif-sur-Yvette, France: Editions Frontieres, pp. 143-150 (1986).

55. W.C. Haxton. Fundamental interaction studies in nuclei. In *Intersections Between Particle and Nuclear Physics: Lake Louise, Canada 1986*, D.F. Geesaman (ed.). AIP Conf. Proc. **150**, pp. 738-749 (1986).
56. W.C. Haxton. Nuclear physics issues in double beta decay. In *Nuclear Beta Decays and Neutrino: Proceedings of the International Symposium, Osaka, Japan, June 1986*, T. Kotani, H. Ejiri, and E. Takasugi (eds.). World Scientific, Singapore, pp. 225-236 (1986).
57. W.C. Haxton. Nuclear tests of symmetries. In *Proceedings of the International Nuclear Physics Conference (Harrogate, 1986)*, J.L. Durell, J.M. Irvine, and G.C. Morrison (eds.). IOP, Bristol, UK, pp. 415-428 (1987).
58. W.C. Haxton. Analytic treatments of matter-enhanced neutrino oscillations. *Phys. Rev. D* **35**, 2352 (1987).
59. E. Adelberger and W.C. Haxton. The  $^{37}\text{Cl}$  solar neutrino capture cross section. *Phys. Rev. C* **36**, 879 (1987).
60. F.T. Avignone, III, C. Baktash, W.C. Barker, F.P. Calaprice, R.W. Dunford, W.C. Haxton, D. Kahana, R.T. Kouzes, H.S. Miley, and D.M. Moltz. Search for axions from the 1115 keV transition in  $^{65}\text{Cu}$ . *Phys. Rev. D* **37**, 618 (1987).
61. W.C. Haxton. Nuclear structure aspects of T invariance tests. In *Tests of Time Reversal Invariance in Neutron Physics*, N.R. Roberson, C.R. Gould, and J.D. Bowman (eds.). World Scientific, p. 108 (1987).
62. W.C. Haxton. Nuclear response of water Cerenkov detectors to supernova and solar neutrinos. *Phys. Rev. D* **36**, 2283 (1987).
63. W.C. Haxton. Low energy neutrino reactions in water Cerenkov detectors. *Nucl. Inst. Meth. A* **264**, 37 (1988).
64. W.C. Haxton. Radiochemical neutrino detection via  $^{127}\text{I}(\nu_e, e^-)^{127}\text{Xe}$ . *Phys. Rev. Lett.* **60**, 768 (1988).
65. W.C. Haxton and C. Johnson. Geochemical integrations of the neutrino flux from stellar collapses. *Nature* **333**, 325 (1988).
66. W.C. Haxton. Neutrino reactions on oxygen and a proposed precision measurement of the Weinberg angle. *Phys. Rev. C* **37**, 2660 (1988).
67. W.C. Haxton. Parity nonconservation in the NN system: nuclear structure issues. *Can. J. Phys.* **66**, 503 (1988).

68. W.C. Haxton. Neutrino heating in supernovae. *Phys. Rev. Lett.* **60**, 1999 (1988).
69. S.E. Woosley and W.C. Haxton. Supernova neutrinos, neutral currents, and the origin of fluorine. *Nature* **334**, 45 (1988).
70. R. Epstein, S. Colgate, and W.C. Haxton. Neutrino-induced *r*-process nucleosynthesis. *Phys. Rev. Lett.* **61**, 2038 (1988).
71. A.G. Williams and W.C. Haxton. Contribution of the axial charge operator in  $2\nu$  double beta decay. In *Intersections between Particle and Nuclear Physics*, G.M. Bunce (ed.). AIP Conf. Proc. **176**, pp. 924-929 (1988).
72. W.C. Haxton. Neutral currents, supernovae neutrinos, and nucleosynthesis. In *Contemporary Topics in Nuclear Structure Physics: Cocoyoc, Mexico, June 9-14, 1988*, R.F. Casten, A. Frank, M. Moshinsky, and s. Pittel (eds.). World Scientific, pp. 41-54 (1989).
73. W.C. Haxton. Proceedings of the Yale Symposium in honor of D.A. Bromley, p. 126 (1988)
74. W.C. Haxton.  $^{37}\text{Ar}$  as a calibration source for solar neutrino detectors. *Phys. Rev. C* **38**, 2474 (1988).
75. W.C. Haxton. Summary: symmetries and spin. In *High Energy Spin Physics*, K.J. Heller (ed.). AIP Conf. Proc. **187**, pp. 456-462 (1989).
76. J.N. Bahcall and W.C. Haxton. Matter-enhanced neutrino oscillations in the standard solar model. *Phys. Rev. D* **40**, 931 (1989).
77. S.E. Woosley, D. Hartmann, R.D. Hoffman and W.C. Haxton. The neutrino process. *Astroph. J.* **356**, 272 (1990).
78. W.C. Haxton, E.M. Henley, and M.J. Musolf. Nucleon and nuclear anapole moments. *Phys. Rev. Lett.* **63**, 949 (1989).
79. S. Ying, W.C. Haxton, and E.M. Henley. Neutral and charged current disintegration of deuterium by solar and supernova neutrinos. *Phys. Rev. D* **40**, 3211 (1989).
80. W.C. Haxton. Reply to 'Comment on  $^{37}\text{Ar}$  as a calibration source for solar neutrinos'. *Phys. Rev. C* **39**, 2081 (1989).
81. W.C. Haxton. Neutrino nucleosynthesis in supernovae: shell model predictions. *Nucl. Phys. A* **507**, 179 (1990).

82. W.C. Haxton. Parity violation in the nucleon-nucleon interaction. In Proc. of the Symposium / Workshop on *Spin and Symmetries*, W.D. Ramsay and W.T.H. van Oers (eds.). TRI-89-5, TRIUMF, p. 13 (1989).
83. W.C. Haxton, S. Ying, and E.M. Henley. Neutrino disintegration of deuterium. In *Weak and Electromagnetic Interactions in Nuclei: Proceedings of the International Symposium (WEIN-89), Montreal, May 15-19, 1989*, P. Depommier (ed.). Editions Frontières, p. 715 (1990).
84. W.C. Haxton. Parity nonconservation and nuclear polarizabilities. In *Parity Violation in Electron Scattering*, E.J. Beise and R.D. McKeown (eds.). World Scientific, Singapore, p. 182 (1990).
85. W.C. Haxton. Proposed neutrino monitor of long-term solar burning. *Phys. Rev. Lett.* **65**, 809 (1990).
86. W.C. Haxton and C. Johnson. Weak interaction rates in  $^{16}\text{O}$ . *Phys. Rev. Lett.* **65**, 1325 (1990).
87. W.C. Haxton. The neutrino process in supernovae. In *Physics News in 1990*. AIP, New York, p. 55 (1990).
88. W.C. Haxton. Supernova neutrinos, giant resonances, and nucleosynthesis. *Nucl. Phys. A* **522**, 325 (1991).
89. W.C. Haxton, D. Hartmann, G. Mathews, T.A. Weaver, and S.E. Woosley. Neutrino-Induced Light Element Synthesis. In *Proc. of the Int. Symposium on Nuclear Astrophysics: Nuclei in the Cosmos*, H. Oberhummer and W. Hillebrandt (eds.). (1990).
90. D.H. Hartmann, W.C. Haxton, R.D. Hoffman, and S.E. Woosley. Neutrino-Induced nucleosynthesis in core-collapse supernovae. *Nucl. Phys. A* **527**, 663 (1991).
91. S.W. Bruenn and W.C. Haxton. Neutrino-nucleus interactions in core-collapse supernovae. *Ap. J.* **376**, 678 (1991).
92. W.C. Haxton and W.-M. Zhang. Solar weak currents, neutrino oscillations, and time variations. *Phys. Rev. D* **43**, 2484 (1991).
93. W.C. Haxton and K.Y. Lee. Red giant evolution, metallicity, and new bounds on hadronic axions. *Phys. Rev. Lett.* **66**, 2557 (1991).
94. W.C. Haxton. Solar and supernova neutrino interactions. In *Trends in Astroparticle Physics*, D. Cline and R. Peccei (ed.). World Scientific, Singapore, p. 483 (1992).
95. W.C. Haxton. Long-term neutrino flux integrations. In *Trends in Astroparticle Physics*, D. Cline and R. Peccei (ed.). World Scientific, Singapore, p. 369 (1992).

96. W.C. Haxton. The neutrino process and neutrino r-process. In *Unstable Nuclei in Astrophysics*. World Scientific, Singapore, p. 263 (1992).
97. W.C. Haxton. Double beta decay mass constraints on 17 keV neutrinos. *Phys. Rev. Lett.* **67**, 2431 (1991).
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198. A. M. Serenelli, W. C. Haxton, and Carlos Pena-Garay. Solar models with accretion I: Application to the solar abundance problem. Submitted to *Ap. J.* (2011)

### **Books Published**

1. M.M. Nieto, W.C. Haxton, C.M. Hoffman, E.W. Kolb, V.D. Sandberg, and J.W. Toevs (eds.). *Science Underground*. AIP Conf. Proc. **96** (1983). Book.
2. G. Kilcup, S. Sharpe, W.C. Haxton, E.M. Henley (eds.). *Phenomenology and Lattice QCD*. World Scientific (1995). Book.
3. W.C. Haxton and E.M. Henley (eds.). *Symmetries and Fundamental Interactions*. World Scientific (1995). Book.
4. J. Bahcall, W. Haxton, K. Kubodera, C. Poole (eds.). *Neutrino Physics: Its Impact on Particle Physics, Astrophysics, and Cosmology*. World Scientific (2000). Book.

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6. B.A. Brown, J. Engel, W.C. Haxton, M. Ramsey-Musolf, M. Romalis, and G. Savard. Proceedings of the 4<sup>th</sup> ANL/MSU/JINA/INT RIA Workshop, to be publishing by World Scientific (2008). Book

### Unpublished Documents

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3. W.C. Haxton *et al.*, for the DUSEL-Homestake Collaboration. Reference design project book: NUSEL-Homestake. nucl-ex/03080151 (2003).
4. W.C. Haxton *et al.*, for the DUSEL-Cascades Collaboration. Deep underground science and engineering laboratory – Cascades: conceptual proposal. <http://www.int.washington.edu/DUSEL/s2/> (2005).
5. W.C. Haxton, for the DUSEL-Cascades Collaboration. DUSEL-Cascades proposal and supplementary materials. arXiv:0705.3699 and <http://www.int.washington.edu/s3/> (2007).
6. S. Raby *et al.*, The DUSEL Theory White Paper, arXiv:0810.4551
7. N. Brickhouse *et al.*, Laboratory Astrophysics and the State of Astronomy and Astrophysics (2009) (Astro2010 position paper; arXiv:0903.2469)
8. N. Brickhouse *et al.*, Roles and Needs of Laboratory Astrophysics in NASA's Space and Earth Science Mission (2009) (white paper for the National Academy of Sciences Space Sciences Board ad hoc committee; arXiv:0903.4592)
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**Talks presented: 1987 to 2008**

93. "New Developments in the Solar Neutrino Problem," invited talk, San Francisco APS meeting, January 1987
94. "Oscillations of Solar Neutrinos," Univ. of California, Santa Cruz, January 1987
95. "Nuclear Tests of Time Reversal Invariance," invited talk, *Workshop on Time Reversal Tests with Neutrons*, North Carolina, April 1987
96. "Nuclear Tests of Time Reversal Invariance," Physics Division, NSF, March 1987
97. "Analytic Treatments of Matter-Enhanced Solar Neutrino Oscillations," invited talk, *Workshop on Solar and Supernovae Neutrinos*, Santa Barbara, May 1987
98. "Parity Nonconservation," Yale University, May 1987
99. "Nuclear Tests of Parity Nonconservation," invited talk, *Workshop on Parity Nonconservation*, Vancouver, BC, May 1987
100. "The Nuclear Response of Water Cerenkov Detectors to Supernova and Solar Neutrinos," invited talk, *Rochester Workshop on Nonaccelerator Physics*, June 1987
101. "Nuclear Tests of Symmetries," Georgetown National Summer School Lecture, June 1987
102. "Fundamental Physics with Nuclei," invited talk, *Symposium in Honor of D.A. Bromley*, Yale University, August 1987
103. "Theoretical Issues in Neutrino Physics," invited talk, *American Chemical Society Meeting*, New Orleans, August 1987
104. Lecture series, TUNL/Duke University, October 1987:
  - "Matter Enhanced Oscillations and the Solar Neutrino Puzzle"
  - "The Galactic Neutrino Flux and SN1987A"
  - "Double Beta Decay"
  - "Parity Nonconservation in the NN System"
  - "Nuclear Tests of Time Reversal Violation"
105. "The Detection of Solar and Galactic Neutrinos," Princeton Univ., November 1987
106. "Symmetry Tests in Nuclei," Caltech, February 1988
107. "Neutrino Reheating in Stellar Collapse," Ohio State, March 1988
108. "Supernova Neutrinos," University of Wisconsin, March 1988

109. "Double Beta Decay," University of Wisconsin, March 1988
110. "The Origin of Fluorine and Other Supernova Stories," Lawrence Berkeley, April 1988
111. "Theoretical Issues in Double Beta Decay," invited talk, Baltimore APS meeting, April 1988
112. "Electric Dipole and Anapole Moments of Nuclei and Atoms," Institute for Theoretical Physics, Santa Barbara, May 1988
113. "Neutrino Opacity in Stellar Collapse," invited talk, Int. Conf. on *Contemporary Topics in Nuclear Structure Physics*, Cocoyoc, Mexico, June 1988
114. "Summary Talk: Spin and Symmetries," invited talk, Int. Conf. on *High Energy Spin Physics*, Minneapolis, September 1988
115. "Neutrino Physics in Collapsing Stars," University of Virginia, December 1988
116. "The Origin of  $^{19}\text{F}$  and other Supernova Stories," Princeton Univ., November 1988
117. "The Origin of  $^{19}\text{F}$  and other Supernova Stories, Michigan State Univ., January 1989
118. "The Origin of  $^{19}\text{F}$  and other Supernova Stories," TRIUMF, February 1989
119. "Neutrino Reheating and Nucleosynthesis in Supernovae," invited talk, UCLA Workshop on the *Next Supernova*, February 1989
120. "Nuclear Physics of Supernovae," colloquium, Oregon State University, February 1989
121. "Nuclear Physics of Supernovae," colloquium, University of Oregon, February 1989
122. "Particle Properties, New Particles, and Anomalous Phenomena," provocateur's talk, Town Meeting on Electroweak Interactions and Astrophysics, Santa Fe, April 1989
123. "Double Beta Decay," Lawrence Berkeley Laboratory, May 1989
124. "Neutrino-induced Nucleosynthesis in Supernovae," Department of Physics, University of California, Berkeley, May 1989
125. "The Nuclear Physics of Stars," invited talk, K1200 Inauguration, Michigan State University, May 1989
126. "Neutrino Astrophysics and the Shell Model," invited talk, Argonne Symposium on the *40th Anniversary of the Shell Model*, May 1989

127. "Parity Violation in the NN Interaction," invited talk, TRIUMF Symposium on Spin and Symmetries, June 1989
128. "Nuclear Astrophysics and Electroweak Physics in the 1990's," invited talk, Asilomar APS meeting, October 1989
129. "Lanczos Algorithm Hamiltonian and Green's Function Techniques," invited talk, Livermore Shell Model Symposium, October 1989
130. "Neutrino Process Synthesis of Light Elements," colloquium, University of Chicago, November 1989
131. "Long-Term Neutrino Monitors of Solar Behavior," Fermi Lab, November 1989
132. "The Solar Neutrino Problem and Double Beta Decay: Theory Summary," invited talk, Berkeley Symposium on *Dark Matter/Low-Activity Counting*, December 1989
133. "Neutrino Nucleosynthesis in Core-Collapse Supernovae," colloquium, Stanford University, January 1990
134. "Parity Nonconservation and Nuclear Polarizabilities," invited talk, Workshop on *Parity Violation in Electron Scattering*, Caltech, February 1990
135. "The Neutrino Process," colloquium, University of South Carolina, March 1990
136. "The Neutrino Process," invited talk, Hollifield Theory Users Group, Oak Ridge National Lab., March 1990
137. "Nuclear Physics in the 1990's," invited talk, Pacific Northwest Association of College Physics Professors, University of Oregon, April 1990
138. "CP, P, and T Tests in Atoms and Nuclei," invited talk, Washington APS meeting, April 1990
139. "Supernova Neutrinos, Giant Resonances, and Nucleosynthesis," invited talk, *Symposium in Honor of Akito Arima*, Santa Fe, May 1990
140. "Neutrino-induced Nucleosynthesis in Core-Collapse Supernovae," invited talk, PANIC '90, Boston, June 1990
141. "Neutrino Tests of Solar Variability," colloquium, University of Texas, Sept. 1990
142. "The Solar Neutrino Problem: Theoretical Status," invited talk, Southeastern APS Sectional meeting/SSC meeting, Atlanta, October 1990



143. "Weak Current Effects in the MSW Mechanism," invited talk, UCLA Workshop on the *Next Supernova*, November 1990
144. "Long-time Integrations of the Solar Neutrino Flux," invited talk, UCLA Conference on *Particle Astrophysics*, November 1990
145. "Neutrino-Nucleus Interactions: Theory Overview," invited talk, LAMPF Neutrino Physics Workshop, January 1991
146. "Oscillations of Solar Neutrinos," Texas A&M, April 1991
147. "Supernova Neutrino Physics," colloquium, Florida State University, April 1991
148. "Oscillations of Solar Neutrinos," colloquium, MIT, April 1991
149. "Weak Interactions and Astrophysics," 10 lectures, Tokyo Metropolitan University, June 1991
150. "The Neutrino Process and Neutrino r-process," invited talk, Workshop on *Unstable Nuclei in Astrophysics*, Tokyo, Japan, June 1991
151. "Neutrinos: Theory," invited talk, American Chemical Society Meeting, New York, August 1991
152. "Solar and Supernova Neutrinos," invited talk, School on Astrofundamental Physics, Erice (Sicily), August 1991
153. "Theory Overview: Solar Neutrinos," invited talk, Workshop on *Theoretical Aspects of Underground Physics*, Toledo, Spain, September 1991
154. "Oscillations of Solar Neutrinos," Colloquium, University of California, San Diego, October 1991
155. "Red Giant Evolution, Metallicity, and New Constraints on Axions," APS meeting, Michigan State University, October 1991
156. "Constraints on T-Violating, P-Conserving NN Forces," APS meeting, Michigan State University, October 1991
157. "Solar Neutrinos," invited talk, AAPT meeting, Michigan State Univ., October 1991
158. "Neutrino Physics in Supernovae," University Lecture, University of Wisconsin, November 1991
159. "Oscillations of Solar Neutrinos," colloquium, University of British Columbia, December 1991

160. "Neutrino Physics of Core-Collapse Supernovae," colloquium, Physics Division, Argonne National Laboratory, February 1992
161. "The Neutrino from Hell and Related Stories," colloquium, University of California, Santa Cruz, February 1992
162. "Neutrino Oscillations and the Solar Neutrino Problem," colloquium, Iowa State University, April 1992
163. "The Neutrino from Hell and Related Stories," Iowa State University, April 1992
164. "Double Beta Decay," colloquium, Washington University, April 1992
165. "Stellar Neutrinos," invited talk, Benjamin Franklin Symposium, Philadelphia, April 1992
166. "Shape Coexistence, Polarizabilities, and Large-Basis Shell-Model Techniques," invited talk, Int. Conf. on *Nuclear Structure at High Angular Momentum*, Ottawa, May 1992
167. "Double Beta Decay: Comparison of Theory to Experiment," invited talk, *Neutrino '92*, Granada, Spain, June 1992
168. "Neutrino Astrophysics," invited talk, Int. Nuclear Physics Conference, Wiesbaden, July 1992
169. "Neutrino Astrophysics," lecture series, TRIUMF Summer School, July 1992
170. "Kaon Regeneration by Density Gradients," University of Melbourne, January 1993
171. "Nuclear Astrophysics," lecture series, Victor Harbor Summer School, Australia, February 1993
172. "The Oscillations of Solar Neutrinos," colloquium, University of Oregon, April 1993
173. "A Strategy for Calibrating the  $^{127}\text{I}$  Solar Neutrino Detector," invited talk, *Workshop on (p,n) Calibrations and Solar Neutrino Detectors*, University of Pennsylvania, April 1993
174. "The Solar Neutrino Puzzle and Neutrino Oscillations," Natural Science Association colloquium, University of Pennsylvania, April 1993
175. "Solar Neutrino Oscillations," invited talk, *International Symposium on Nuclear Structure Physics Today*, Taiwan, May 1993
176. "Density Fluctuations and Neutrino Oscillations," Caltech, May 1993

177. "The Neutrino Process," invited talk, *Symposium on Weak Interactions, Nuclear Astrophysics, and Cosmology, in Honor of Sam Austin*, Michigan State University, June 1993
178. "T-odd P-even Nuclear Forces," TUNL, September 1993
179. "Core-Collapse Supernovae," invited talk, APS meeting, Asilomar, October 1993
180. " $^{127}\text{I}$  Solar Neutrino Experiment," NSF, December 1993
181. "Nuclear and Atomic Tests of T violation," colloquium, Indiana University, January 1994
182. "Oscillations of Solar Neutrinos," colloquium, LBL Nuclear Science Division, February 1994
183. "Neutrino Physics Summary," invited talk, *Workshop on Strategies for Detecting Dark Matter Particles*, Berkeley, February 1994
184. "Nuclear Tests of Symmetries and Conservation Laws," APS Meeting tutorial, Crystal City, April 1994
185. "Limits on CP-Nonconserving Interactions from Electric Dipole Moments," invited talk, First Int. Conf. on *Symmetries in Subatomic Physics*, Taiwan, May 1994
186. "Summary talk: Outlook from the Intersections," 5th Int. Conf. on the *Intersections of Particle and Nuclear Physics*, St. Petersburg, June 1994
187. "Neutrino Physics Overview," invited talk, Snowmass workshop on *Particle and Nuclear Astrophysics and Cosmology in the Next Millenium*, July 1994
188. "Solar and Supernova Neutrinos," Snowmass workshop on *Particle and Nuclear Astrophysics and Cosmology in the Next Millenium*, July 1994
189. "Core Collapse Supernovae and Nucleosynthesis," invited lectures, *3rd School on Astrofundamental Physics*, Erice, September 1994.
190. "Nuclear Tests of Symmetries," invited talk, *Joint Meeting of the Canadian/Mexican/American Physical Societies*, Cancun, September, 1994.
191. "Astrophysical Neutrinos," colloquium, University of California, Santa Cruz, October 1994.
192. "Low Energy Symmetry Tests," invited talk, *TRIUMF Symposium*, December 1994.
193. "The Solar Neutrino Problem," invited talk, *Joint Meeting of the Canadian/Mexican/American Physical Societies*, Quebec City, June 1995.

194. "Nuclear and Atomic Physics of the Solar Neutrino Problem," invited talk, TAUP '95, Toledo, Spain, September 1995.
195. "Neutrino Physics and Astrophysics," Winter retreat lectures, MIT, January 1996.
196. "The Fractional Quantum Hall Effect," Carnegie Mellon University, January 1996.
197. "Shell Structure of the Fractional Quantum Hall Effect," Caltech, February 1996.
198. "Lectures on Neutrino Astrophysics," JPS/KOSEF Winter School, Seoul, Korea, February 1996.
199. "The Solar Neutrino Problem," colloquium, University of Arizona, March 1996.
200. "The Solar Neutrino Problem," colloquium, University of Oregon, April 1996.
201. "Frontiers in Astrophysics," invited talk, APS General Meeting, May 1996.
202. "Other Tests of Neutrino Masses," ITAMP/INT *Workshop on Tritium  $\beta$  Decay*, May 1996.
203. "The Supernova Mechanism and Nucleosynthesis," ECT\* workshop on *Neutron Stars and Supernovae*, Trento, June, 1996.
204. "Neutrinos and the Solar Neutrino Problem," lecture series, TRIUMF Summer School, July, 1996.
205. "Neutrino Astrophysics," invited talk, *Fred Reines Symposium*, Los Alamos National Laboratory, August, 1996.
206. "A First-Landau-Level Laughlin/Jain Wave Function for the Fractional Quantum Hall Effect," Univ. of Illinois, October, 1996.
207. "Supernovae Neutrinos and Nucleosynthesis," 13th Peter Axel Colloquium, Univ. of Illinois, October, 1996.
208. "Summary and Outlook," invited talk, *20 Years of the Meson Physics Facilities*, Los Alamos National Laboratory, October, 1996.
209. "The Mixing of  $^3\text{He}$  in the Standard Solar Model," invited talk, UCLA Symposium on Flavor-Changing Neutral Currents, February, 1997.
210. "Solar Neutrinos: You Have to be Very Careful When You Don't Know Where You Are Going Because You Might Not Get There," colloquium, Harvard University, March, 1997.
211. "Parity Violation and the Anapole Moment," Lawrence Berkeley Laboratory,

March, 1997.

212. "Solar Neutrinos," colloquium, University of California, Berkeley, April, 1997.
213. "On the Possibility of a Nonstandard Solar Model Solution to the Solar Neutrino Puzzle," invited talk, "Intersections of Particle and Nuclear Physics," Big Sky, Montana, May, 1997.
214. "Atomic Tests of Time Reversal and Parity," Argonne National Laboratory, June, 1997.
215. "The Solar Neutrino Problem," invited talk, Erice School on Neutrinos in Astro, Particle, and Nuclear Physics," September, 1997.
216. "Solar and Supernova Constraints on Cosmologically Interesting Neutrinos," invited talk, Erice School on Astrofundamental Physics, September, 1997.
217. "Solar Neutrinos: Neutrino Mixing or a Mixed Sun?" colloquium, Argonne National Laboratory, September, 1997.
218. "Nonstandard Solar Model Possibilities," invited talk, ITP Conference on Solar Neutrinos, December, 1997.
219. "Nuclear Astrophysics," summer school lecture series, Canberra, Australia, January, 1998.
220. "Condensation in the Fractional Quantum Hall Effect," University of Kentucky, February, 1998.
221. "Solar Neutrinos: Neutrino Mixing and Core Mixing," colloquium, University of Kentucky, February, 1998.
222. "Solar Neutrinos: Neutrino Mixing and Core Mixing," colloquium, North Carolina State University, February, 1998.
223. "Taking the Model Out of the Shell Model," Lawrence Livermore National Laboratory, March, 1998.
224. "R-Process Nucleosynthesis and Supernova Neutrinos," colloquium, Lawrence Berkeley National Laboratory, April, 1998.
225. "R-Process Nucleosynthesis and Supernova Neutrinos," colloquium, University of California, Santa Cruz, April, 1998.
226. "Solar Neutrinos," colloquium, Univ. of Minnesota, April, 1998.

227. "Nuclear Physics of Solar Neutrinos," invited talk, Neutrino '98, Takayama, Japan, June, 1998.
228. "Neutrino Interactions," summer school lecture, Tokyo Metropolitan University, Japan, June, 1998.
229. "Topics in Nuclear Astrophysics," summer school lectures, TASI, Boulder, Colorado, June 1998.
230. "Fundamental Interactions and Theory," invited talk, International Nuclear Physics Conference, Paris, August, 1998.
231. "Theoretical Issues in Neutrino Physics," invited talk, Baryons '98, September, 1998.
232. "The r-process: Progress and Puzzles," invited talk, DNP APS meeting, Santa Fe, October, 1998.
233. "The Fractional Quantum Hall Effect," invited talk, symposium in honor of Peter Rosen, Santa Fe, October, 1998.
234. "The Fractional Quantum Hall Effect," invited talk US/Japan Symposium on Symmetries, Honolulu, February, 1999.
235. "The Classical Nuclear Structure Problem as an Effective Theory," invited talk, Second Workshop on Effective Field Theory in Nuclear Physics, INT (Seattle), February, 1999.
236. "Neutrinos: A Glimpse of the Big Picture," invited talk (Centennial Symposium), APS Centennial Meeting, Atlanta, March, 1999.
237. "Solar and Other Neutrino Problems," colloquium, Arizona State University, April, 1999.
238. "Taking the "Model" out of the Shell Model," seminar, Argonne National Laboratory, Argonne, Illinois, May, 1999.
239. "Nuclear Astrophysics," invited talk, Inner Space/Outer Space, Fermilab, May, 1999.
240. "The Shell Model in Nuclear Astrophysics," invited talk, Conference on 50 years of the Shell Model, Heidelberg, June, 1999.
241. "Nuclear Astrophysics: Open Problems in Theory," invited talk, DNP Town Meeting on Nuclear Astrophysics, Notre Dame, June, 1999.
242. "Overview of the Effects on Neutrinos in Nucleosynthesis," invited talk, Sedona Conference on Astrophysics, July, 1999.

243. "The Canonical Nuclear Structure Problem as an Effective Theory," University of Maryland, September, 1999.
244. "The Shell Model as an Effective Theory," seminar, LLNL, September, 1999.
245. "Neutrino Astrophysics and High Performance Computing," invited talk, CSIT Symposium, Florida State University, November, 1999.
246. "Neutrino Astrophysics and Future Challenges," invited talk, Board on Physics and Astronomy, NAS, Irving, November, 1999.
247. "Recent Developments in Neutrino Physics," invited talk, National Academy of Sciences regional meeting, Seattle, January, 2000.
248. "Neutrino Mass, Oscillations, and the Solar Neutrino Problem," colloquium, Caltech, February, 2000.
249. "Morphing the Shell Model into an Effective Theory," seminar, Caltech, February, 2000.
250. "Solar and Atmospheric Neutrinos," colloquium, MIT, February, 2000.
251. "Morphing the Shell Model into an Effective Theory," seminar, Center for Theoretical Physics, MIT, February, 2000.
252. "Neutrino Effects in Nucleosynthesis," invited talk, Carolina Symposium on Neutrino Physics, Univ. South Carolina, March, 2000.
253. "Solar Neutrino Oscillations," colloquium, Physics Division, Brookhaven National Laboratory, March, 2000.
254. "Solar Neutrinos and Neutrino Oscillations," Physics/Theory Divisions Colloquium, Los Alamos National Laboratory, March, 2000.
255. "Morphing the Shell Model into an Effective Theory," seminar, Los Alamos National Laboratory, March, 2000.
256. "Nuclear Astrophysics," RIA Town Meeting, Durham, NC, July, 2000.
257. "The Shell Model as an Effective Theory, seminar, Michigan State University, September, 2000.
258. "Neutrino Mass Working Group Summary," Neutrino Workshop, Seattle, September, 2000.
259. "Nuclear Symmetry Tests and the Electroweak Interaction," invited talk, APS DNP

- meeting, Williamsburg, October, 2000.
260. "Massive Neutrinos and their Role in Nuclear Astrophysics," invited talk, Copenhagen-Giessen European Graduate College Inaugural, Giessen, October, 2000.
  261. "The Canonical Nuclear Many-Body Problem as an Effective Theory," invited talk, Nuclei and Nucleons, Darmstadt, October, 2000.
  262. "Neutrinos: From Pauli to John Updike," Miller Fellows seminar, UC Berkeley, February 2001.
  263. "Supernova and Nucleosynthesis," Lawrence Berkeley Laboratory, March 2001.
  264. "Atomic Parity Nonconservation and Nuclear Anapole Moments," UC Berkeley, March 2001.
  265. "Solar and Other Neutrino Problems," colloquium, Univ. of Tennessee, March 2001.
  266. "The Shell Model as Effective Theory," Physics Division colloquium, Oak Ridge National Laboratory, March 2001.
  267. "The Shell Model as Effective Theory," nuclear seminar, Lawrence Berkeley National Laboratory, March 2001.
  268. "Solar Neutrinos and Neutrino Oscillations," Bethe lecture colloquium, Cornell, April, 2001.
  269. "Neutrinos: John Updike and the Big Bang," Bethe public lecture, Cornell, April 2001.
  270. "Prospects for a National Underground Laboratory," invited talk, Visions of the Future of Particle Physics, University of Pennsylvania, April, 2001.
  271. "Supernovae and Nucleosynthesis," Bethe lecture colloquium, Cornell, April, 2001.
  272. "A National Underground Science Laboratory," Cornell, April, 2001.
  273. "Physics of and Possibilities for a National Underground Science Laboratory," invited talk, Washington APS meeting, April, 2001.
  274. "Neutrinos, Mixing, Supernovae, and Nucleosynthesis," NRC Committee on the Physics of the Universe, May, 2001.
  275. "Prospects for a National Underground Science Laboratory," LBNL Nuclear Science colloquium, June, 2001.



276. "Homestake as a National Underground Science Laboratory," Snowmass invited talk, July, 2001.
277. "Homestake as a National Underground Science Laboratory," colloquium, Fermilab, August, 2001.
278. "Underground Science," Brookhaven National Laboratory, September, 2001.
279. "A Deep Underground Laboratory," colloquium, MIT, November 2001.
280. "A National Underground Science Laboratory," colloquium, Univ. of Victoria, November, 2001.
281. "Solar Neutrinos – looking forward," invited talk, Workshop on New Neutrino and Nucleon Decay Experiments, LSU, December, 2001.
282. "A National Underground Science Laboratory," colloquium, University of Illinois, March, 2002.
283. "Hadronic Parity Violation and Anapole Moments," University of Illinois, March, 2002.
284. "Solar Neutrinos Oscillations and Implications Elsewhere," INT Workshop on Neutrino Masses and Mixing, April, 2002.
285. "A National Underground Science Laboratory," invited talk, APS General Meeting, Albuquerque, April, 2002.
286. "Progress Toward a National Underground Laboratory at Homestake," plenary talk, APS Northwest Section annual meeting, Banff, May, 2002.
287. "Supernova Connections: Mechanism, Nucleosynthesis, and Neutrinos," seminar, Aspen Program on Underground Science, June, 2002.
288. "A National Underground Science Laboratory," presentation to NRC Neutrino Facilities Committee, June, 2002.
289. "Solar Neutrinos, Neutrino Astrophysics, and Supernovae," lecture series, Summer School on Neutrinos Physics and Astrophysics, Feza Gursey Institute, Istanbul, July, 2002.
290. "Nuclear Astrophysics," lecture series, International School "Enrico Fermi" "From Nuclei and their Constituents to Stars", Varenna, Italy, August 2002.
291. "The Science Case for a National Underground Laboratory," colloquium, UC Berkeley, September, 2002.

292. "The Science Case for a National Underground Laboratory," colloquium, University of Arizona, September, 2002.
293. "The Science Case for a National Underground Laboratory," colloquium, Caltech, October, 2002.
294. "Neutrino Physics Overview," invited talk, "Workshop on Neutrino News from the Lab and the Cosmos," Fermilab, October, 2002.
295. "Neutrino Physics," KITP bag lunch, Santa Barbara, February 2003.
296. "Future Solar and Double Beta Decay Experiments: Physics Motivation," presentation to NSAC's Orbach subcommittee, New Brunswick, NJ, February 2003.
297. "NUSEL-Homestake," presentation to Universities Research Association, Washington DC, April 2003.
298. "NUSEL-Homestake," presentation to Associated Universities Inc, Washington DC, April 2003.
299. "A National Underground Science and Engineering Laboratory," colloquium, University of Maryland, April 2003.
300. "The Future of Neutrino Astrophysics," colloquium, Bartol Research Institute, University of Delaware, April 2003.
301. "The Future of Neutrino Astrophysics," invited talk, Franklin Prize Symposium, University of Pennsylvania, April 2003.
302. "A National Underground Science and Engineering Laboratory," Case Western Reserve University, April 2003.
303. "Neutrino Astrophysics," invited talk, Michigan State University Symposium on Rare Isotopes and Accelerators, May 2003.
304. "Neutrino Astrophysics," summer school lectures, ECT\*, Trento, Italy, June 2003.
305. "A National Underground Science and Engineering Laboratory," invited talk, Nuclear Physics Gordon Conference, Colby College, Maine, July 2003.
306. "Status of NUSEL Efforts," INPAC meeting, San Diego, October 2003.
307. "Neutrino Physics," invited talk, Ten Years of ECT\*, Trento, Italy, October 2003.
308. "NUSEL Status and Associated Accelerator Laboratory," invited talk, Workshop for an Underground Accelerator, Tucson, October 2003.

309. "Connecting Quarks with the Cosmos: Notes from the Underground," plenary talk, Fall meeting of the Division of Nuclear Physics, American Physical Society, Tucson, October 2003.
310. "NUSEL-Icicle Creek," Joint BNL/UCLA Workshop on Proton Decay/Neutrino Oscillation Detector, Los Angeles, December 2003.
311. "Supernova Neutrino-Nucleus Physics and the r-process," invited talk, INT Workshop on the r-process: The Astrophysical Origin of the Heavy Elements, Seattle, January 2004.
312. "NUSEL-Cascades," colloquium, Colorado School of Mines, Golden, CO, March 2004.
313. "Neutrino-Nucleus Interactions and Nucleosynthesis," invited talk, Carolina Neutrino Symposium, Columbia, SC, April 2004.
314. "Nuclear Tests of Neutrino Properties," Bethe Prize talk, Spring Meeting of the American Physical Society, Denver, May 2004.
315. "DUSEL-Cascades and Underground Science," colloquium, University of Washington, May 2004.
316. "Deep Underground Science and the Possibility of a Cascades Site for DUSEL," colloquium, TRIUMF, June 2004
317. "Deep Underground Science and DUSEL-Cascades," public talk, Wenatchee Valley College, October 2004
318. "Underground Science and the DUSEL Effort," Lawrence Berkeley Laboratory, October 2004
319. "Underground Science and the DUSEL Effort," colloquium, Univ. Notre Dame, October 2004
320. "Underground Physics and Other Deep Science," colloquium, Penn State Univ., October 2004
321. "The University of Washington's DUSEL Effort," University Day presentation, Pacific Northwest National Laboratory, November 2004
322. "Underground Science and the DUSEL Effort," Caltech, November 2004
323. "Underground Science and Deep Underground Laboratory Possibilities," T/P-Division colloquium, LANL, December 2004
324. "DUSEL-Cascades Summary," Univ. of Colorado DUSEL Workshop, January 2005

325. "Deep Underground Science and DUSEL-Cascades," colloquium, Arizona State Univ., January 2005
326. "DUSEL-Cascades," Science and Technology Round Table, Seattle, February 2005
327. "School Lectures: 3rd CERN-CLAF School of High Energy Physics: Solar, Supernova, and other Neutrino Physics," Malargue, Argentina, March 2005
328. "Neutrinos," MathDay lecture, Univ. Washington, March 2005
329. "Institute for Nuclear Theory," presentation to NSAC Subcommittee dealing with expected FY-06 budget shortfalls, Washington D.C., March 2005
330. "UW Efforts on Underground Laboratories," Microsoft-University of Washington symposium, Seattle, April 2005
331. "DUSEL-Cascades," UC Berkeley (web broadcast), April 2005
332. "DUSEL-Cascades: Physics and Geology," colloquium, Central Washington University, May 2005
333. "DUSEL\_Cascades," invited talk, Rapid Excavation and Tunneling Conference, Seattle, June 2005
334. "Solar Models," presented at A Tribute to John Bahcall, Institute for Advanced Study, Princeton, October 2005
335. "Piecewise Moments Method for Nuclear Response Surfaces," SciDAC Supernova Meeting, University of North Carolina, January 2006
336. "Neutrinos," MathDay lecture, Univ. Washington, March 2006
337. "Harmonic-Oscillator-Based Effective Theory," Argonne/MSU/INT/JINA RIA Workshop, Argonne National Laboratory, April 2006
338. "Harmonic-Oscillator-Based Effective Theory," Argonne/MSU/INT/JINA RIA Workshop, Argonne National Laboratory, April 2006
339. "Nuclear Astrophysics," plenary talk, CIPANP 2006, Puerto Rico, May 2006
340. "Neutrino Astrophysics: The Sun and Beyond," invited talk, Hans Bethe Centennial Symposium, Cornell University, June 2006
341. "International Underground Laboratories," invited talk, NuFact06 (Neutrino Factory and Superbeams Workshop), UC Irvine, August, 2006

342. "Looking to the Future: Nuclear Intersections with New Physics," invited talk, Celebrating Vijay Pandharipande Symposium, Univ Illinois, September 2006
343. "Supernova Neutrino Astrophysics and Nucleosynthesis," plenary talk, American Astronomical Society Meeting, Seattle, January 2007
344. "RISAC Recommendations on RIA," presentation to the NAS's Engineering and Physical Sciences Board on behalf of the NRC's RISAC Committee, March 2007
345. "Neutrinos and Nucleosynthesis," colloquium, Univ. of Minnesota, March 2007
346. "Topics in Neutrino Astrophysics," colloquium, MIT, March 2007
347. "Solar Neutrinos: Models, Observations, Some Future Plans," invited talk, Nuclear Astrophysics: Beyond the First Fifty Years, Caltech, 7/07
348. "Nuclear Constraints on the Weak NN Potential," talk presented at the INT Workshop on Rare Isotopes and Fundamental Symmetries 9/07
349. "Lectures on Neutrinos and Neutrino Astrophysics," three lectures presented at the 2007 European Graduate School on Complex Systems of Hadrons and Nuclei, Obergurgl, Austria 10/07
350. "The Form of the Effective Interaction in Harmonic-Oscillator-Based Effective Theory," talked presented at the INT workshop on New Approaches in Many-Body Theory, 10/07
351. "Solar Neutrinos: The CNO Cycle in the Standard Solar Model," colloquium, UC Berkeley, 2/08
352. "Neutrinos and Mass," UW MathDay Lecture, 3/08
353. "Double Beta Decay," invited talk, DUSEL Theory Workshop, Center for Cosmology and Astroparticle Physics, Ohio State University, 4/08
354. "Theory Perspective on the GGS Experiment," invited talk, Neutrino Helicity at 50: Celebration of the Goldhaber-Grodzins-Sunyar Experiment, Brookhaven Laboratory, 5/08
355. "CN Neutrinos and the Sun's Primordial Metallicity," invited talk, Carolina International Symposium on Neutrino Physics, Columbus, South Carolina, 5/08
356. "Edward Teller and Nuclei: Along the Trail to Neutrinos," invited talk, Edward Teller Centennial Symposium, Livermore, 5/08
357. "CN Neutrinos, Solar Metallicity, and the Gaseous Giants," colloquium, Kavli Institute for Cosmological Physics, University of Chicago, 6/08

358. "Probing T-Odd Moments in Atoms and Nuclei," colloquium, Physics Division, Argonne National Laboratory, 6/08
359. "Metal Differentiation in the Late-Stage Evolution of the Solar System," Orsay, France, 9/08
360. "The Status of the Standard Solar Model and the Importance of New Tests of that Model," invited talk, Neutrino Frontiers, University of Minnesota, 10/08
361. "Fundamental Symmetries in Atoms and Nuclei," Student Day lecture, International Conference on Particles and Nuclei, Eilat, Israel, 11/08
362. "Fundamental Symmetries and Conservation Laws," plenary talk, International Conference on Particles and Nuclei, Eilat, Israel, 11/08
363. "CN-cycle Solar Neutrinos and the Sun's Primordial Core Metallicity," contributed talk, International Conference on Particles and Nuclei, Eilat, Israel, 11/08
364. "Solar Neutrinos: Coming Full Cycle," colloquium, Washington State University, 1/09
365. "Some Science Motivations for DUSEL," RMP Seminar, LBNL, 2/09
366. "Neutrinos and Mass," University of Washington "Math Day" public talk, 3/09
367. "Solar Neutrinos and Planetary Formation," colloquium, Montana State University, 4/09
368. "Solar Neutrinos and Solar Metallicity," colloquium, TRIUMF, Vancouver, 4/09
369. "CIPANP09: Closing Talk," invited talk, CIPANP09, San Diego, 5/09
370. "Neutrino Properties and Astrophysics I & II," From Quarks to the Cosmos Summer School, INT, University of Washington, 7/09
371. "Harmonic-Oscillator-Based Effective Theory," invited talk, Scientific Grand Challenges in National Security: The Role of Computing at the Extreme Scale, Washington, D.C., 10/09
372. "Neutrinos, Metals, and the Protoplanetary Disk," colloquium, University of California, San Diego, 11/09
373. "Solar Neutrinos, Planets, and SNO+," LBNL Nuclear Science Division, 1/10
374. "Neutrinos, Metals, and the Protoplanetary Disk," INT Workshop on Neutrino Mass Measurements, Univ. Washington, 2/10

375. "Neutrinos, Metals, and the Protoplanetary Disk," colloquium, Old Dominion University, 3/10
376. "Neutrinos, Metals, and the Protoplanetary Disk, colloquium, University of California, Santa Cruz, 4/10
377. "CNO Solar Neutrinos and Solar Metals," colloquium, Lawrence Livermore National Laboratory, 5/10
378. "CNO Solar Neutrinos and Solar Metals," colloquium, Jefferson Laboratory, 6/10
379. "Twenty Years of the INT," talk presented at the INT 20<sup>th</sup> Anniversary Symposium, Univ. Washington, 7/10
380. "SLAC Summer Institute Lectures: Solar Neutrinos I, II, and III," SLAC Summer Institute on "Neutrinos: Nature's Mysterious Messengers," 8/10
381. "Neutrino Responses and the Long-Baseline Program," seminar, INT, Univ. Washington, 8/10
382. "Neutrinos: The Next Steps," colloquium, LBNL Nuclear Science Division, 9/10
383. "Cosmology and Fundamental Physics: Laboratory Astrophysics and Theory Connections," invited talk, 2010 NASA Laboratory Astrophysics Workshop, Gatlinburg, TN 10/10
384. "Nuclear Electric Dipole Moment Calculations," invited talk, APS Division of Nuclear Physics Meeting, Santa Fe, 11/10
385. "A Cold r-process in Metal-Poor Stars," CENPA, University of Washington, 12/10
386. "The Potential of Precise Solar Neutrino Spectroscopy," invited talk, NNN2010, Toyama, Japan 12/10
387. "The Origin of the Elements: A Cosmic Story," public talk, Morrison Planetarium, California Academy of the Sciences, San Francisco, 1/11