

*Curriculum Vitae*  
PIERRE SIKIVIE

**Business Address:**

Physics Department  
University of Florida  
Gainesville, FL 32611  
Telephone: (352) 392-1923  
Email: sikivie@phys.ufl.edu

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EDUCATION

Ph.D.	Yale University	1972-75 (Physics)
M.S.	Yale University	1970-72 (Physics)
Licencié en Sciences	University of Liège, Belgium	1966-70 (Physics)

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PROFESSIONAL EXPERIENCE

Distinguished Professor of Physics, University of Florida, August 2012-present  
Associate Member, CERN, January-June 2006  
Member, Institute for Advanced Study, September-December 2005  
Professor of Physics, University of Florida, September 1988-August 2012  
Associate Professor of Physics, University of Florida, September 1984-August 1988  
Assistant Professor of Physics, University of Florida, September 1983-August 1984  
Assistant Professor of Physics and Mathematics, University of Florida, September 1981-1983  
Senior Fellow, CERN Theory Group, Geneva, Switzerland, October 1979-August 1981  
Research Associate, SLAC Theory Group, Stanford, California, 1977-1979  
Research Associate, Department of Physics and Astronomy, University of Maryland, College Park,  
1975-1977

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MEMBERSHIP IN PROFESSIONAL SOCIETIES, AWARDS:

Yale University Fellowship, Sept. 1970-Aug. 1975  
Fellow, American Physical Society, since 1994  
Member, American Association for The Advancement of Science  
Jesse W. Beams Medal of the Southeastern Section of the American Physical Society, 1996  
Guggenheim Fellow, July 1997-July 1998  
Member, Aspen Center for Physics, 1997-2007  
Professorial Excellence Award (PEP), University of Florida, 1998  
IBM Einstein Endowed Fellowship, Institute for Advanced Study, Fall 2005  
University of Florida Research Foundation (UFRF) Professorship, 2006-09  
Member, International Science Advisory Board of the Center for Axion and Precision Physics (IBS/CAPP)  
in Daejeon, Korea, 2018 - 2022  
J.J. Sakurai Prize for Theoretical Particle Physics, American Physical Society, 2020.

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## FUNDING

Research funded by the US Department of Energy since 1981, and by the Heising-Simons Foundation in 2017-2019.

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## PUBLICATIONS:

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2. Charm and the Hadron Mass Differences, Yale Preprint COO-3075-87 (November 1974) 11 pages.
3. Six Quark Model for the Suppression of  $\Delta S = 1$  Neutral Currents, with F. Gürsey and P. Ramond, Phys. Rev. D12, 2166 (1975).
4. A Universal Gauge Theory Model Based on E<sub>6</sub>, with F. Gürsey and P. Ramond, Phys. Letters 60B, 177-180 (1976); reprinted in “Unified Theories of Elementary Particles”, a Series of Selected Papers in Physics Published by the Physical Society of Japan, M. Kobayashi and M. Yoshimura, editors.
5. Lepton and Hadron Spectra in Universal Gauge Theories, Ph.D. Thesis (1975), 99 pages.
6. E<sub>7</sub> as a Universal Gauge Group, with F. Gürsey, Phys. Rev. Letters 36, 775-778 (1976).
7. Gauge Theoretical Realization of the Superweak Model of CP Violation, Phys. Letters 65B, 141-144 (1976).
8. Quark and Lepton Assignments in the E<sub>7</sub> Model, with F. Gürsey, Phys. Rev. D16, 816-834 (1977).
9. Lepton Assignments in the E<sub>7</sub> Model and Trimuon Events in Neutrino Scattering, with V. K. Cung and C. W. Kim, Phys. Rev. D18, 3164-3171 (1978).
10. Screening Solutions to Classical Yang-Mills Theory, with N. Weiss, Phys. Rev. Lett. 40, 1411-1413 (1978).
11. Classical Yang-Mills Theory in the Presence of External Sources, with N. Weiss, Phys. Rev. D18, 3809-3821 (1978).
12. Static Sources in Classical Yang-Mills Theory, with N. Weiss, Phys. Rev. D20, 487 (1979).
13. Instability of Abelian Field Configurations in Yang-Mills Theory, Phys. Rev. D20, 877 (1979).
14. Constraints on Charged-Higgs-Boson Couplings, with L. F. Abbott and M. B. Wise, Phys. Rev. D21, 1393-1403 (1980).
15. Cabibbo-Suppressed Non-Leptonic D Decays, with L. F. Abbott and M. B. Wise, Phys. Rev. D21, 768-771 (1980).
16. Isospin Breaking in Technicolour Models, with L. Susskind, M. Voloshin and V. Zakarov, Nucl. Phys. B173, 189 (1980).
17. Problems and Virtues of Scalarless Theories of Electroweak Interactions, with S. Dimopoulos and S. Raby, Nucl. Phys. B176, 449 (1980).
18. Fermion Masses and Weak Isospin in Technicolour Models, AIP Conference Proceedings No. 68, “High Energy Physics-1980”, Edited by L. Durand and L. G. Pondrom, pp. 496-500.
19. An Introduction to Technicolour, in Proceedings of the International School of Physics “Enrico Fermi”, Varenna, August 1980. Edited by G. Costa and R. R. Gatto, North-Holland 1982, pp. 208-236.

20. Can One Test Technicolour?, with J. Ellis, M. K. Gaillard and D. Nanopoulos, Nucl. Phys. B182, 529-545 (1981); reprinted in “Dynamical Gauge Symmetry Breaking”, E. Farhi and R. Jackiw, editors, Taylor and Frances Publ. Co., 1982.
21. Search For Light Technimesons, with J. Ellis and D. V. Nanopoulos, Phys. Lett. B101, 387-392 (1981).
22. Technicolour Particles at LEP, with G. Barbiellini, G. Coignet, J. Ellis, M. K. Gaillard, G. Girardi, C. Matteuzzi, D. V. Nanopoulos, A. Savoy-Navarro, P. Sorba and B. H. Wiik, DESY preprint (1981) 66 pages.
23. Cabibbo Angles Without Scalars, with J. Ellis, Phys. Letters B104, 141-146 (1981).
24. Light Composite Fermions, Phys. Letters B103, 437-439 (1981).
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28. Dynamical Mass Generation for Quarks and Leptons, in the Proceedings of the Cargèse Summer School (24-31 May, 1981). Edited by M. Lévy, J.-L. Basdevant, D. Speiser, J. Weyers, M. Jacob and R. Gastmans. Plenum Press, 1982, pp. 403-420.
29. Axions, Domain Walls and the Early Universe, Phys. Rev. Lett. 48, 1156 (1982).
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33. Axions in Cosmology, in the Proceedings of the Gif-sur-Yvette Summer School, September 1982. Institut National de Physique Nucléaire et de Physique des Particules, Paris, pp. 1-40.
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79. Stretching Wiggly Strings, with Jaewan Kim, Phys. Rev. D50 (1994) 7410-7420.
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81. Casimir Forces Between Beads on Strings and Membranes, with Eric d'Hoker and Youli Kanev, Phys. Lett. B347 (1995) 56-62.
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83. Velocity Peaks in the Cold Dark Matter Spectrum on Earth, with I. Tkachev and Y. Wang, Phys. Rev. Lett. 75 (1995) 2911-2915.
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125. Resonantly Enhanced Axion-Photon Regeneration, with D. B. Tanner and K. van Bibber, Phys. Rev. Lett. 98 (2007) 172002.
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127. Dark Matter Caustics in Galaxy Clusters, with V. Onemli, Phys. Lett. B675 (2009) 279-282.



128. A Further Look at Particle Annihilation in Dark Matter Caustics, with A. Natarajan, *Phys. Rev. D* **77** (2008) 043531.
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130. Axion Theory, in the Proceedings of "Hamburg 2008", the Fourth Patras Workshop on Axions, WIMPs and WISPs, held at DESY, Hamburg, Germany, June 18-21, 2008, edited by Axel Lindner. pp 13-16.
131. Axions, a chapter in the book "Particle Dark Matter", edited by Gianfranco Bertone, Cambridge University Press, 2009, pp 204-227.
132. Bose-Einstein Condensation of Dark Matter Axions, with Q. Yang, *Phys. Rev. Lett.* **103** (2009) 111301.
133. Detailed Design of a Resonantly Enhanced Axion-Photon Regeneration Experiment, with G. Mueller, D.B. Tanner and K. van Bibber, *Phys. Rev. D* **80** (2009) 072004.
134. Dark Matter Axions, in the Proceedings of "Crossing the Boundaries: Gauge Dynamics at Strong Coupling", in honor of the 60th birthday of Misha Shifman, Minneapolis, May 14-17, 2009, edited by Marco Peloso and Arkady Vainshtein, World Scientific, 2010, pp 415-427.
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139. Resonantly Enhanced Axion-Photon Regeneration, with G. Mueller, D.B. Tanner and K. van Bibber, in the Proceedings of the International Conference "Axions 2010", Gainesville, Florida, January 15-17, 2010, edited by David B. Tanner and Karl A. van Bibber, *AIP Conf. Proc.* **1274** (2010) 150-155.
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142. Axion Dark Matter and Cosmological Parameters, with O. Erken, H. Tam and Q. Yang, *Phys. Rev. Lett.* **108** (2012) 061304.
143. A Search for Non-Virialized Axionic Dark Matter, J. Hoskins et al. (the ADMX Collaboration), *Phys. Rev. D* **84** (2011) 121302.
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145. Cosmic Axion Thermalization, with O. Erken, H. Tam and Q. Yang, *Phys. Rev. D* **85** (2012) 063520 [22 pages].
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153. Cosmic Axion Bose-Einstein Condensation, with N. Banik, arXiv:1501.05913, a chapter in the book *Universal Themes of Bose-Einstein Condensation*, edited by N.P. Proukakis, D.W. Snoke and P.B. Littlewood, Cambridge University Press 2017.
154. Linear Newtonian Perturbation Theory from the Schrödinger-Poisson Equations, with N. Banik, A. Christopherson and E. Todarello, Phys. Rev. D91 (2015) 123540.
155. The Rethermalizing Bose-Einstein Condensate of Dark Matter Axions, with N. Banik, A. Christopherson and E. Todarello, arXiv:1509.02081, Proceedings of the 11th Patras Workshop on Axions, WIMPs and WISPs, Zaragoza, Spain, June 22-26, 2015.
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157. Cavity design for high-frequency axion dark matter detectors, I. Stern et al., Rev. Sci. Instr. 86 (2015) 123305.
158. Duration of classicality in highly degenerate interacting Bosonic systems, with E. Todarello, Phys. Lett. B770 (2017) 331.
159. Modulation sensitive search for nonvirialized dark matter axions, J. Hoskins et al., Phys. Rev. D94 (2016) 082001.
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161. Towards a medium-scale axion helioscope and haloscope, V. Anastassopoulos et al. (TASTE Collaboration), JINST 12 (2017) P11019.
162. Gravitational self-interactions of a degenerate quantum scalar field, with S. Chakrabarty, S. Enomoto, Y. Han and E. Todarello, Phys. Rev. D97 (2018) 043531.
163. Duration of classicality of homogeneous condensates with attractive interactions, with S. Chakrabarty, S. Enomoto, Y. Han and E. Todarello, arXiv:1712.08219, Proceedings of the 13th Patras Workshop on Axions, WIMPs and WISPs, Thessaloniki, May 15-19, 2017.
164. A Search for invisible axion dark matter with the Axion Dark Matter Experiment, N. Du et al. (ADMX Collaboration), Phys. Rev. Lett. 120 (2018) 151301.
165. Axion dark matter and the 21 cm signal, Phys. Dark Univ. 24 (2019) 100289.
166. Effects of a caustic ring of dark matter on the distribution of stars and interstellar gas, with S. Chakrabarty, Phys. Rev. D98 (2018) 103009.
167. Searching for Low Mass Axions with an LC circuit, with N. Crisosto, N.S. Sullivan and D.B. Tanner, Springer Proc. Phys. 211 (2018) 127.
168. Piezoelectrically Tuned Multimode Cavity Search for Axion Dark Matter, C. Boutan et al. (ADMX Collaboration), Phys. Rev. Lett. 121 (2018) 261302.
169. Production and detection of an axion dark matter echo, with Ariel Arza, Phys. Rev. Lett. 123 (2019) 131804.

170. Extended Search for the Invisible Axion with the Axion Dark Matter Experiment, T. Braine et al. (ADMX Collaboration), *Phys. Rev. Lett.* 124 (2020) 101303.
171. ADMX SLIC: Results from a Superconducting LC Circuit Investigating Cold Axions, N. Crisosto, P. Sikivie, N.S. Sullivan, D.B. Tanner, J. Yang and G. Rybka. (ADMX Collaboration) *Phys. Rev. Lett.* 124 (2020) 241101.
172. Search for 5-9 micro-eV Axions with ADMX Four-Cavity Array, J. Yang, J. Gleason, S. Jois, I. Stern and P. Sikivie, *Springer Proc. Phys.* 245 (2020) 53-62.
173. Invisible Axion Search Methods, *Rev. Mod. Phys.* 93 (2021) 1, 015004.
174. Implications of triangular features in the Gaia skymap for the Caustic Ring Model of the Milky Way halo, S. Chakrabarty, Y. Han, A. Gonzalez and P. Sikivie, *Physics of the Dark Universe* 33 (2021) 100838.
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176. Axion Dark Matter eXperiment: Run 1B analysis details, C. Bartram et al. (ADMX Collaboration), *Phys. Rev. D* 103 (2021) 032002.
177. Clean Energy from Dark Matter?, e-Print 2107.14300, Frank Wilczek Festschrift, edited by A. Niemi, K.K. Phua and A. Shapere, World Scientific 2022.
178. Search for Invisible Axion Dark Matter in the 3.3 - 4.2  $\mu\text{eV}$  range, C. Bartram et al. (ADMX Collaboration), *Phys. Rev. Lett.* 127 (2021) 261803.
179. Resonant excitation of the axion field during the QCD phase transition. with Wei Xue, *Phys. Rev. D* 105 (2022) 043533.
180. Dark Matter Axion Search Using a Josephson Traveling Wave Parametric Amplifier, C. Bartram et al. (ADMX Collaboration), *Rev. Sci. Instr.* 94 (2023) 044703.
181. Low Frequency (100-600 MHz) Searches with Axion Cavity Haloscopes, S. Chakrabarty et al. (ADMX Collaboration), e-Print: 2303.07116.
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#### BOOKS EDITED:

“Axions ’98, Proceedings of the 5th IFT Workshop, Gainesville, Florida, March 13-15, 1998, North-Holland, 1999 [Nucl. Phys. B (Proc. Suppl.) 72 (1999), pp 1-240].

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#### LECTURES OR SPEECHES AT PROFESSIONAL CONFERENCES/ MEETINGS:

1. “On the Unification of the Strong, Weak and Electromagnetic Interactions” at the 1977 Gordon Conference on Elementary Particles and Fields, August 1977.
2. “Technicolour” at the Oxford University Workshop on the Problem of Mass, May 1980.
3. “Fermion Masses and Weak Isospin in Technicolour Models” at the XXth International Conference on High Energy Physics, Madison, July 1980.
4. “An Introduction to Technicolour”, four lectures at the International School of Physics “Enrico Fermi”, Varenna, August 1980.

5. "Technicolour", two lectures at the ICTP Conference on Grand Unification and related topics, September 1980.
6. "Phenomenological Implications of Technicolour Theories" at the XVIth Rencontre de Moriond, March 1981.
7. "Dynamical Mass Generation for Quarks and Leptons" at the IVth Warsaw Symposium on Elementary Particle Physics, May 1981.
8. "Dynamical Mass Generation for Quarks and Leptons" at the Cargese Summer School, July 1981.
9. "Unification of Strong, Weak and Electromagnetic Interactions" at the American Physical Society, New Orleans, November 1981.
10. "Dynamical Symmetry Breaking" four lectures at the Schladming Winter School, February 25 - March 6, 1982.
11. "Axions in Cosmology" and "Dynamical Mass Generation for Quarks and Leptons", five lectures at the Gif-sur-Yvette Summer School in Particle Physics, September 1982.
12. "Invisible Axions?" at the Fourth Workshop on Grand Unification, Philadelphia, April 1983.
13. "Experimental Tests of the 'Invisible' Axion" at the Conference on Low Energy Tests of Conservation Laws, at Blacksburg, VA, September 1983.
14. "Cosmic Axions" at the Fifth Workshop on Grand Unification, Providence, R.I., April 1984.
15. "Axions in Astrophysics and Cosmology" at the Inner Space-Outer Space Conference on Physics at the Interface of Astrophysics/Cosmology and Particle Physics, Batavia, Illinois, May 1984.
16. "Axions and Axionic Domain Walls in Cosmology" at the Coseners' House Workshop on the Very Early Universe, March 21-22, 1985, Abingdon, England.
17. "Invisible Axion Detectors" at the 6th Workshop on Grand Unification, April 17-20, 1985, Minneapolis, Minnesota. This talk was also given at: The International Symposium on "Particles and the Universe", June 24-29, 1985, Thessaloniki, Greece. – The 3rd Workshop on Recent Developments in High Energy Physics, July 1-10, 1985, Chania-Crete, Greece. – The International Europhysics Conference on High Energy Physics, July 18-24, 1985, Bari, Italy.
18. "Axions", three lectures at the Les Houches Summer School in Theoretical Physics, July 1985, Les Houches, France.
19. "The Axion Couplings", two lectures at the 1986 GIFT Seminar on Cosmology and Particle Physics, June 1986, Peñíscola, Spain.
20. "On the Entrainment of Dark Matter to the Center of the Galaxy" and "The Evolution of Axion Strings in the Early Universe" at the VIIIth Moriond Workshop on New and Exotic Phenomena, January 1987, Les Arcs, France.
21. "Electromagnetic Detectors of Cosmic and Solar Axions" at the 1987 Spring Meeting of the American Physical Society in Washington, D.C., April 1987.
22. "Axions '87 and Global String Dynamics" at the International Europhysics Conference on High Energy Physics, Uppsala, Sweden, June 1987.
23. "NWOGU Theory Summary" at the Ninth Workshop on Grand Unification, Aix-les-Bains, France, April 1988.
24. "Solar and Cosmic Axion Hunting", two lectures at the 3<sup>d</sup> Nishinomiya-Yukawa Symposium, Nishinomiya, Japan, Nov. 1988.
25. "Coupling and Abundance of Cosmic Axions", at the Workshop on Cosmic Axions, Brookhaven National Laboratory, April 13-14, 1989.

26. "Search for Dark Matter Axions", at the Symposium on Quantum Fluids and Solids - 1989, University of Florida, Gainesville, April 24-28, 1989.
27. "Observational Implications of an Exact Nambu-Goldstone Boson", at the Topical Seminar on Astrophysics and Particle Physics, San Miniato (Italy), May 8-12, 1989.
28. "The Strong CP Problem and the Axion", at the International Conference on CP Violation in Particle Physics and Astrophysics, Blois (France), May 22-26, 1989.
29. "Axions '90 Update", at the DPF '90 Meeting of the American Physical Society, at Rice University, Houston, Texas, January 4, 1990.
30. "Global Cosmic Strings", at the Nobel '90 Symposium on the Birth and Evolution of the Early Universe, Gräftavallen, Sweden, June 11-16, 1990.
31. "Cosmic Axion Searches" at the Annual Meeting of the South Eastern Section of the American Physical Society, Decatur, Georgia, July 17, 1990; and at the Texas/ESO-CERN Symposium, Brighton, England, Dec. 12-16, 1990.
32. "Axion Searches", at the International School on Particles and Cosmology, Baksan Valley, USSR, May 6-12, 1991.
33. "Axions", two lectures at the Theoretical Advanced Study Institute, Boulder, Colorado, June 1991.
34. "Dark Matter Axions", at the First IFT Workshop, Gainesville, Florida, Feb. 14-16, 1992; and at the Coral Gables Conference on Unified Symmetry in the Small and the Large, Jan. 1993.
35. "Dark Matter Axions '93", at the Workshop "The Dark Side of the Universe", in Rome, Italy, June 23-25, 1993; and at the 17th John Hopkins Workshop on Current Problems in Particle Theory "Particles and the Universe", in Budapest, Hungary, July 30-Aug. 1, 1993.
36. "Physics on a String", at the Annual Meeting of the Southeastern Section of the American Physical Society, Columbia, S.C., Nov. 4-6, 1993; and at the Coral Gables Conference on "Unified Symmetry in the Small and in the Large", Coral Gables, Jan. 27-30, 1994.
37. "Axions: Theoretical Overview", at the Workshop on Strategies for the Detection of Dark Matter Particles, Lawrence Berkeley Laboratory, Feb. 21-24, 1994.
38. "Sources and Distributions of Dark Matter", at the Conference "Trends in Astroparticle Physics", Stockholm, Sweden, Sept. 23, 1994.
39. "Physics on a String", at the Workshop on "Topological Defects in Cosmology", I. Newton Institute, Cambridge, England, Nov. 16-17, 1994.
40. "Dark Matter Axions", 4 lectures at the VIth Argentine Symposium of Theoretical Physics on Particles and Fields, Bariloche, Argentina, Jan. 16-19, 1995.
41. "Introduction to the theory of axions" at the XXXth Rencontre de Moriond, Villars-sur-Ollon, Suisse, Jan. 25, 1995.
42. "What is the spectrum of cold dark matter particles on Earth?", at the DM96 Workshop on Sources and Detection of Dark Matter in the Universe, Santa Monica, CA, Feb. 14-16, 1996.
43. "Dark Matter Axions" at the APCTP Inauguration Conference, Seoul, Korea, June 4-10, 1996.
44. "Dark Matter Axions" at the Workshop on Aspects of Dark Matter in Astro- and Particle Physics, Heidelberg, Germany, Sept. 16-20, 1996.
45. "The strong CP problem" at the DESY Theory Workshop on Discrete Symmetries, Hamburg, Germany, Sept. 25-27, 1996.
46. "What is the spectrum of dark matter particles on Earth?", at the 2nd RESCEU International Symposium on Dark Matter in the Universe and its Direct Detection, Tokyo, Japan, Nov. 26-28, 1996.

47. “Dark Matter Axions and Caustic Rings” at the Workshop “Beyond the Desert ’97”, Castle Ringberg, Tegernsee, Germany, June 8-14, 1997.
48. “Caustic rings of Dark Matter” at the DM98 Workshop on Dark Matter and its Direct Detection, Los Angeles, Feb. 19-21, 1998.
49. “Axion Dark Matter” at the 5th IFT Workshop on Axions, Gainesville, Florida, March 13-15, 1998.
50. “The search for axion dark matter”, at the Tropical Workshop on Particle Physics and Cosmology, San Juan, Puerto Rico, April 1-7, 1998.
51. “Axion dark matter and caustic rings”, at the Dark ’98 Conference, Heidelberg, Germany, July 20-25, 1998.
52. “Velocity peaks and caustic rings”, at the 2nd International Workshop on the Identification of Dark Matter, Buxton, England, Sept. 7-11, 1998.
53. “Axions, strings and caustic rings” at the “Beyond ’99” Conference, Castle Ringberg, Tegernsee, Germany, June 6-11, 1999.
54. “Searches for Axions” at the TAUP ’99 Conference, Paris, France, Sept. 6-10, 1999.
55. “Searches for Axions” at Adrianfest, Rochester, NY, Sept. 24-25, 1999.
56. “Caustic rings of dark matter” at the COSMO ’99 Conference, Trieste, Italy, Sept. 27 - Oct. 1, 1999.
57. “Axions and dark matter caustics” at the Rutherford Laboratory Winter Meeting, Chilton, England, Dec. 15-17, 1999.
58. “Dark Matter Caustics” at the Aspen Winter Workshop on Astrophysics, Aspen, CO, Jan. 31-Feb. 5, 2000.
59. “Dark Matter Caustics” at the 3rd International Conference on the Identification of Dark Matter, York, England, Sept. 18-22, 2000.
60. “Axions” at the Snowmass 2001 Conference on the Future of Particle Physics, Snowmass, CO, July 18, 2001.
61. “Axions and How to Find Them” at the 30th Coral Gables Conference on High Energy Physics and Cosmology, Dec. 12-16, 2001.
62. “Dark Matter Caustics” at the COSMO-01 International Workshop on Particle Physics and The Early Universe, Aug. 30-Sept. 4, 2001, Rovaniemi, Finland.
63. “The Big Flow” at the 29th Coral Gables Conference on Cosmology and Elementary Particle Physics, Fort Lauderdale, Florida, December 12-16, 2001.
64. “Axion Cosmology” at PecceiFest, Los Angeles, CA, Jan. 11-12, 2002.
65. “Dark Matter Caustics” at the DM2002 Conference, Los Angeles, Feb. 20-22, 2002.
66. “The Strong CP Problem” at the XIV Rencontre de Blois, on the Matter-Antimatter Asymmetry, Blois, France, June 17-21, 2002.
67. “Axions and Their Distribution in Galactic Halos” at the IDM2002 Conference, York, England, September 2-6, 2002.
68. “Evidence for Ring Caustics in the Milky Way” at the “Beyond ’03” Conference, Ringberg Castle, Tegernsee, Germany, June 9-14, 2003.
69. “Cold Dark Matter Caustics” at the PASCOS ’04 Conference, Boston, Aug. 16-22, 2004.
70. “Cold Dark Matter Flows and Caustics” at the IDM 2004 Conference, Edinburgh, UK, Sept. 6-10, 2004.

71. “The Search for Axion Dark Matter” at the Miami 2004 Conference on Elementary Particle Physics and Cosmology, in Key Biscayne, Florida, December 15-19, 2004.
72. “The axion hypothesis is alive and well” at the PASCOS 2005 Conference, in Gyeongju, Korea, May 29 - June 4, 2005.
73. “Axion Searches, Old and New” at the Joint ILIAS-CERN-CAST Axion Training Program, CERN, Nov. 30-Dec. 2, 2005.
74. “The ADMX Search for Axion Dark Matter” at the 41st Rencontres de Moriond on Electroweak Interactions and Unified Theories, La Thuile, Italy, March 11-18, 2006.
75. “Dark Matter Detection and Galactic Halo Models”, at the APS April Meeting, Dallas, TX, April 22-25, 2006.
76. “The Search for Axion Dark Matter” at the 2nd Joint ILIAS-CERN-CAST Axion Training Program, Patras, Greece, May 18-19, 2006.
77. “Axion Physics Overview”, opening talk at the IAS Workshop on Axions, Princeton, October 20-22, 2006.
78. “Dark Matter Caustics”, at the DSU07 Conference on the Dark Side of the University, Minneapolis, June 5-10, 2007.
79. “Dark Matter Caustics”, at the Miami 2007 Conference on Elementary Particles, Astrophysics and Cosmology, Fort Lauderdale, December 13-18, 2007.
80. “Dark Matter Caustics”, at the UCLA Dark Matter 2008 Conference, Los Angeles, Feb. 20-22, 2008.
81. “Dark Matter Caustics”, at the “Dark Side of the Universe” Workshop in Ann Arbor, MI, May 26-June 14, 2008.
82. “Axion Theory”, at the Fourth Patras Workshop on Axions, WIMPS and WISPs, at DESY, Hamburg, June 18-21, 2008.
83. “The Dark Matter Puzzle”, Public Lecture at DESY, June 19, 2008.
84. “Invisible Axion Searches”, at the CPT@ICTP Workshop, Trieste, Italy, July 2-5, 2008.
85. “Dark Matter Axions”, at the Aspen Winter Conference on Dark Matter and Dark Energy, Aspen, Jan. 25-Feb. 1, 2009.
86. “The Dark Matter Puzzle”, International Year of Astronomy Public Lecture, U of Florida, March 20, 2009.
87. “Dark Matter Axions”, at ‘Shifmania’, a Workshop in honor of Misha Shifman’s 60th Birthday, Minneapolis, May 13-17, 2009.
88. “Axions”, at the 3d International Workshop on the Interconnection between Particle Physics and Cosmology, Norman, Oklahoma, May 18-22, 2009.
89. “Bose-Einstein Condensation of Dark Matter Axions”, at the Texas Cosmology Network Meeting in Austin, October 28-30, 2009.
90. “The Case for Axion Dark Matter”, at the Galileo Galilei Institute International Conference on Dark Matter, Florence, May 21, 2010.
91. “Bose-Einstein Condensation of Dark Matter Axions”, at IDM2010, the 8th International Workshop on the Identification of Dark Matter, Montpellier, France, July 29, 2010.
92. “Bose-Einstein Condensation of Dark Matter Axions”, at the Cosmo/COS-Pa International Conference in Tokyo, September 29, 2010.

93. "Bose-Einstein Condensation of Dark Matter Axions", at the ASK 2011 International Workshop in Seoul, Korea, April 11-12, 2011.
94. "Bose-Einstein Condensation of Dark Matter Axions" at the 7th Patras Workshop on Axions, WIMPs and WISPs, Mykonos Island, Greece, July 26-31, 2011.
95. "Axions as Dark Matter" at the DMUTH11 Workshop on Dark Matter at CERN, Geneva, Switzerland, July 18-29, 2011.
96. "Axion Theory Overview" at the Intensity Frontier Workshop, HSPAW Working Group, Rockville, MD, November 30 - December 2, 2011.
97. "Bose-Einstein Condensation of Dark Matter Axions" at the Miami 2011 Topical Conference on Elementary Particles, Astrophysics, and Cosmology, Fort Lauderdale, FL, December 15-20, 2011.
98. "Bose-Einstein Condensation of Dark Matter Axions" at the UCLA 2012 Symposium on Sources and Detection of Dark Matter and Dark Energy in the Universe, Los Angeles, CA, February 22-24, 2012.
99. "Axion BEC Dark Matter" at the Vistas in Axion Physics Workshop, Seattle, WA April 23-26, 2012.
100. "Dark Matter Axions" at the 24th Rencontres de Blois on Particle Physics and Cosmology, Blois, France, May 27 - June 1, 2012.
101. "An argument that the dark matter is axions", at the SLAC Cosmic Frontier Workshop, Stanford, CA, March 6-8, 2013.
102. "Bose-Einstein condensation of axion dark matter", at the Workshop on Universal Themes in Bose-Einstein Condensation, Leyden, The Netherlands, March 11-15, 2013.
103. "An argument that the dark matter is axions", at the KITP Conference on Identifying and Characterizing Dark Matter via Multiple Probes, Santa Barbara, May 13-17, 2013.
104. "An argument that the dark matter is axions", at the DESY Workshop on 'Dark Matter: A Light Move', Hamburg, Germany, June 17-19, 2013.
105. "Axions and the Galactic Angular Momentum Problem", invited talk at the 9th Workshop on Axions, WIMPs and WISPs, Mainz, Germany, June 24-28, 2013.
106. "An argument that the dark matter is axions", at the Miami 2013 Topical Conference on Elementary Particles, Astrophysics and Cosmology, Fort Lauderdale, December 12-18, 2013.
107. "An argument that the dark matter is axions", at UCLA's 11th Symposium on Sources and Detection of Dark Matter and Dark Energy in the Universe, Los Angeles, February 26-28, 2014.
108. "Dark Matter Axions", three talks at the Gran Sasso Lectures on Dark Matter, Gran Sasso Laboratory, Italy, October 21-23, 2014.
109. "Axion Dark Matter", and "Bose-Einstein Condensation of Dark Matter Axions", two talks at the Saclay Workshop on Axion Theory and Searches, Saclay, France, June 10-12, 2015.
110. "Bose-Einstein Condensation of Dark Matter Axions", at the 11th Patras Workshop on Axions, WIMPs and WISPs, Zaragoza, Spain, June 22-26, 2015.
111. "Axion dark matter: motivation and search techniques", at the UCLA Dark Matter Conference, Los Angeles, February 17-19, 2016.
112. "New and old ideas on axion physics" and "Axion searches", two talks at the Bethe Forum on Axions and the Low Energy Frontier, March 7-18, 2016, Bonn, Germany.
113. "Bose-Einstein condensation of dark matter axions", at the IDM 2016 International Workshop on the Identification of Dark Matter in Sheffield, England, July 18-22, 2016.



114. "Axion dark matter", at the COSMO 2016 International Cosmology Conference in Ann Arbor, MI, August 8-12, 2016.
115. "Dark matter axions", three lectures at the UNAM Mini-Workshop on Dark Matter, Mexico City, November 7-10, 2016.
116. "The Search for Axions" and "Bose-Einstein condensation of dark matter axions", two talks at the Axion Dark Matter Conference at Nordita, Stockholm, December 5-9, 2016.
117. "Dark Matter Axions" at the 17th International Workshop on Neutrino Telescopes, Venice, March 13-17, 2017.
118. "Gravitational self-interactions of a degenerate quantum scalar field", at the 13th Patras Conference on Axions and WIMPs in Thessaloniki, Greece, May 15-19, 2017.
119. "Bose-Einstein condensation of dark matter axions", at the Annual Meeting of the Korean Physical Society, Gyeongju, Korea, October 25-27, 2017.
120. "The Search for Axions" and "Summary Talk", at the Institute for Basic Science Conference on the Dark World, Daejeon, Korea, October 30 - November 3, 2017.
121. "Dark Matter Axions", at the Topical Workshop on Dark Matter, Nanyang Technological University, Singapore, November 13-15, 2017.
122. "Bose-Einstein condensation of dark matter axions", at the Miami 2017 Conference on Elementary Particles, Astrophysics and Cosmology, Fort Lauderdale, December 13-19, 2017.
123. "The 21-cm signal and axion dark matter", talk at the Miami 2018 Physics Conference, Fort Lauderdale, December 16, 2018.
124. "The Axion Echo Method and the Big Flow" at the 15th Patras Workshop on Axions, Wimps and Wisps, Freiburg, Germany, June 3-7, 2019.
125. "The Axion Echo Method and the Big Flow" and "Workshop Summary" at the CERN Theory Institute on Axions, CERN, July 15-19, 2019.
126. "The Axion Echo Method and the Big Flow" at TomFest, a Symposium in honor of Tom Weiler 70th Birthday, Vanderbilt University, August 14, 2019.
127. "The Axion Echo Method and the Big Flow" at the 2019 IBS Conference on the Dark World, November 4-7, 2019, in Daejeon, Korea.
128. "Encounters with the Axion", J.J. Sakurai Prize Invited Talk at the 2020 April Meeting of the American Physical Society, April 18-21, 2020, online.
129. "Dark Matter Caustics", International Center for Theoretical Physics Conference, Tata Institute of Fundamental Research, Bangalore, India, November 9-15, 2020, online.
130. "Axion dark matter", Beijing China-wide seminar, April 14, 2021, online.
131. "Axion dark matter", special guest lecture, Bad Honnef School, Germany, August 20, 2021, online.
132. "Axion dark matter", invited talk at the SUSY 2021 International Conference in Beijing, China, August 24, 2021, online.
133. "Axion dark matter", plenary talk at the 2021 meeting of the Turkish Physical Society, Bodrum, Turkey, September 3, 2021, online.
134. "Axions in Particle Physics and Cosmology", and " 'Invisible' Axion Search Methods", two lectures at the Ettore Majorana Summer School on Subnuclear Physics, Erice, Italy, June 16-23, 2022.
134. "Axion Dark Matter", plenary talk at the 2022 CIPANP Conference in Orlando, Florida, September 3, 2022.