**Publications of FrankWilczek**

1. Ultraviolet Behavior of Non-Abelian Gauge Theories (with D. Gross), *Phys. Rev. Lett.* **30,**1343 (1973). Doi: 10.1103/PhysRevLett.30.1343 [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taRTJJT2I2UjZsTHM/view?usp=sharing)
2. Asymptotically Free Gauge Theories, I (with D. Gross), *Phys. Rev. D* **8*,***3633 (1973). Doi: 10.1103/PhysRevD.8.3633 [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taSVo5X0RWMW1VTzg/view?usp=sharing)
3. Asymptotically Free Gauge Theories, II (with D. Gross), *Phys. Rev. D* **9,** 980 (1974). Doi: 10.1103/PhysRevD.9.980 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacHNnVFJaeXhMVWc)
4. Gauge Dependence of Renormalization Group Parameters (with W. Caswell), *Phys. Lett.*

 **B49,** 291 (1974) Doi: 10.1016/0370-2693(74)90437-7 [PDF](https://drive.google.com/file/d/1T5LRf-g4ov0turMiB4Gkjgm_NwzLkOG7/view?usp=sharing)

1. Possible Non-Regge Behavior of Electroproduction Structure Functions (with A. DeRujula,

 S.L. Glashow, H.D. Politzer, S.B. Treiman and A. Zee), *Phys. Rev. D* **10,** 1649 (1974). Doi:

10.1103/PhysRevD.10.1649 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taclZGNURPc0xVdVk)

1. Scaling Deviations for Neutrino Reactions in Asymptotically Free Field Theories (with S. Treiman and A. Zee) *Phys. Rev. D* **10,** 2881 (1974) DOI: 10.1103/PhysRevD.10.2881 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRnhlaWVWYmZXd0U)
2. Implications of Anomalous Lorentz Structure in Neutral Weak Processes (with R. Kingsley and A. Zee), *Phys. Rev****.*** D **10,** 2216 (1974). DOI: 10.1103/PhysRevD.10.2216 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabW5kZWlVaXZNTTQ)
3. Scaling Properties of a Gauge Theory with Han-Nambu Quarks and Charged Vector Gluons (with T.P. Cheng), *Phys. Lett.* **53B,** 269 (1974). DOI: 10.1016/0370-2693(74)90476-6 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taM29Vb0p5YnhMT1E)
4. Some Experimental Consequences of Asymptotic Freedom, Proceedings: *AIP Conference* #**23,** 596, AIP Press, (1975). DOI: 10.1063/1.2947451
5. Tests of Coupling Types in Weak Muonless Reactions (with R.L. Kingsley, R. Shrock and S.B. Treiman), *Phys. Rev.* D **11,** 1043 (1975). DOI: 10.1103/PhysRevD.11.1043 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQlFhOGN5MGJFbjA)
6. Remarks on the New Resonances at 3.1 GeV and 3.7 GeV (with C.G. Callan, R.L. Kingsley,S.B. Treiman and A. Zee), *Phys. Rev. Lett.* **34,** 52 (1975). DOI: 10.1103/PhysRevLett.34.52 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taX1JCbGM1QkJsNjg)
7. Weak Decays of Charmed Hadrons (with R.L. Kingsley, S.B. Treiman and A. Zee), *Phys. Rev.*

D **11,** 1919 (1975). DOI: 10.1103/PhysRevD.11.1919 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tab2d4UDU0T2xYS0k)

1. Weak Decays of Charmed Hadrons, II: Soft Meson Theorems (with R.L. Kingsley, S. Treiman and A. Zee), *Phys. Rev****.*** D **12,** 106 (1975). DOI: 10.1103/PhysRevD.12.106 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSkRPNGxFUE1vMTg)
2. Possible Degeneracy of Heavy Quarks, *Phys. Lett.*  **59B,** 179 (1975). DOI: 10.1016/0370-2693(75)90697-8 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadHdjeW1aV1FJbHM)
3. Weak Interactions with New Quarks and Right-Handed Currents (with R.L. Kingsley, S.B. Treiman and A. Zee), *Phys. Rev.* D **12,** 2768 (1975). DOI: 10.1103/PhysRevD.12.2768 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ25wX2plZl8wb1k)
4. Weak Interactions of Heavy Quarks (with R.L. Kingsley and A. Zee), *Phys. Lett.* **61B,** 259 (1976). DOI: 10.1016/0370-2693(76)90144-1 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ25wX2plZl8wb1k)
5. New Leptons and Old Lepton Numbers (with A. Zee), *Nucl. Phys.* **B106,** 461 (1976). DOI: 10.1016/0550-3213(76)90390-4 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taOHptRXVNY1pGUDA)
6. Non-Uniqueness of Gauge Field Potentials (with S. Deser), *Phys. Lett.* **65B,** 391 (1976).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWGhzaXhpRjgtbWM)
7. Inequivalent Embeddings of SU (2) and Instanton Interactions, *Phys. Lett****.* 65B,** 160 (1976). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taOVlrczI0VjZCMEE)
8. Rare Muon Decays, Natural Lepton Models, and Doubly Charged Leptons (with A. Zee), *Phys. Rev. Lett.* **38,** 531 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZlVRdHdzOWpXX2M)
9. Mass Corrections in Deep-Inelastic Scattering (with D. Gross and S. Treiman), *Phys. Rev.*

 *D* **15,** 2486 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSDdFWjZBZm5yUTg)

1. ∆I = ½ Rule and Right-Handed Currents: Heavy-Quark Expansion and Limitations in Zweig’s Rule (with A. Zee), *Phys. Rev. D* **15,** 2660 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadXNDTS1yMlBlbjA)
2. A Model for Weak Trimuon Production (with A. Zee and S. Treiman), *Phys. Lett.* **68B,** 369 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRDZ5ZnItdHFFY3M)
3. Orientation of the Weak Interaction with Respect to the Strong Interaction (with A. Zee),

*Phys. Rev. D* **15,** 3701 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUExiVk5vV0VYRVk)

1. Rare Muon Decays, Heavy Leptons and CP Violations (with S. Treiman and A. Zee), *Phys. Rev. D* **16,** 152 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taV0hDUWluMUZ2MzQ)
2. Geometry and Interaction of Instantons, *Quark Confinement and Field Theory: Proceedings of a Conference at the University of Rochester, Rochester, NY, June 14-18, 1976,* Stump and Weingarten, eds. (Wiley-Interscience, NY, 1977), pp. 211-219.
3. Possible New Species of Quarks and Hadrons (with A. Zee), *Phys. Rev. D* **16,** 860 (1977). [PDF](https://drive.google.com/file/d/1rjGWbvy8wtl5XWQ_BoQNwYxCjeqjnXn4/view?usp=sharing)
4. Asymptotic Freedom: A Status Report, *Proceedings of Brookhaven APS Meeting, Brookhaven National Lab., Upton, NY,* pp.C79-C87.
5. Sum Rules for Spin-Dependent Electroproduction - Test of Relativistic Constituent Quarks (with S. Wandzura), *Phys. Lett.* **B*72,***195 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taLVNaTElLWks3UWM)
6. Decay of Heavy Vector Mesons into Higgs Particles, *Phys. Rev. Lett.* **39,** 1304 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUkx4SVRHQVlWV3c)
7. Discrete Flavor Symmetries and a Formula for the Cabibbo Angle (with A. Zee), *Phys. Lett.*

**B70,** 418 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaXBrOEw5QmhvUFk)

1. Instantons and Spin Forces Between Massive Quarks (with A. Zee), *Phys. Rev. Lett.* **40,** 83 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeGNpVnloVTNDRmM)
2. Problems of Strong P and T Invariance in the Presence of Instantons, *Phys. Rev. Lett.* **40,** 279 (1977). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taT3J4bkJtZWZId0k)
3. Some Problems in Gauge Field Theories, *The Unification of Elementary Forces and Gauge Theories: Proceedings of the Ben Lee Memorial International Conference on Parity Noncon- servation, Weak Neutral Currents and Gauge Theories,* Fermi National Accelerator Laboratory, Batavia, 1977 (N.Y., Harwood Academic Press, 1978) pp. 607-621. [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadzdMRGFNUmJHVlE)
4. Axion Emission in Decay of Nuclear Excited States (with S. Treiman), *Phys. Lett.* **B74,** 381 (1978). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZnEtZmR3cWVyUjQ)
5. Low Energy Manifestations of Heavy Particles: Application to Neutral Current (with J. Collins and A. Zee), *Phys. Rev. D* **18,** 242 (1978). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVjVadDZBNlJNR0U)
6. Effect of Instantons on the Heavy Quark Potential (with C. Callan, R. Dashen, D. Gross and A. Zee). *Phys. Rev. D* **18,** 4684 (1978). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUUFGQ2xXOVdGbTg)
7. Steps Toward the Heavy Quark Potential, “50 Years of the Dirac Equation,” published in *AIP Conference Proceedings,*(APS Press), (48), pp. 30-37, (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUFNVTkRleVZCYXc)
8. Matter-Antimatter Accounting, Thermodynamics, and Black Hole Radiation (with D. Toussaint, S. Treiman and A. Zee), *Phys. Rev. D* **19,** 1036 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacV83WEtoaURfa0U)
9. Elementary Examples of Baryon Number Generation (with D. Toussaint), *Phys. Lett.* **B81,** 238 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRWZrQ1pvS2RMT3c)
10. Horizontal Interactions and Weak Mixing Angles (with A. Zee), *Phys. Rev. Lett.* **42,** 421 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYU1RbEVoektOdkU)
11. Light Quark Masses and Isospin Violation (with D. Gross and S. Treiman), *Phys. Rev. D* **19,** 2188 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVVRaUUZyNmJaUzg)
12. SU(3) Predictions for Charmed Meson Decays (with S. Treiman), *Phys. Rev. Lett.* **43,** 816 (1979). [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taVVRjVUR0T2NIaGM/view?usp=sharing)
13. Interference Effects in Charmed Meson Decays (with S. Treiman), *Phys. Rev. Lett.* **43,** 1059 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMlI5RkJYa1lGU0k)
14. Operator Analysis of Nucleon Decay (with A. Zee), *Phys. Rev. Lett.* **43,** 1571 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taN1F5U1c2UDRIeFE)
15. Unification of Fundamental Forces, Proceedings of *Lepton and Photon Interactions at High Energies Conference,* (9th) eds. Kirk and Abarbanel, pp. 437-445, (Batavia, IL 1979). [PDF](https://drive.google.com/file/d/1BFsjRcO8gEc1SYkA6-JeGCBWlUgOil8p/view?usp=sharing)
16. Conservation or Violation of B − L in Proton Decay (with A. Zee), *Phys. Lett.* **B88,** 311 (1979). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taall2ejE1cWFnNjA)
17. Possibility and Consequences of T Violation in Nucleon Decay (with Anya Hurlbert), *Phys. Lett.* **B93,** 274 (1980). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZnp2RmtWVTN3MzQ)
18. Symmetry Relations in Nucleon Decay (with Anya Hurlbert), *Phys. Lett.* **B92,** 95 (198*0*). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadkYyWExDVWxlUFE)
19. Thermalization of Baryon Asymmetry (with S. Treiman), *Phys. Lett.* **B95,** 222 (1980). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taT1NGN1hoYjBza3M)
20. Hyperweak Interactions, *Proceedings: “Particles and Fields” Conference,* Montreal; *APS Press* (1980). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taakVqUV9uSVkxSUU)
21. Cosmic Asymmetry Between Matter and Antimatter, *Scientific American,* December 1980, p.82. [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadlFoRjFNZFpiMFk)
22. Constraints on Neutrinos (with D. Toussaint), *Nature* **289,** 777 (1981). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRlhTRERjTGZQVWc)
23. Price of Fractional Charge in Unified Theories (with L.F. Li), *Phys. Lett.* **B107,** 64 (1981). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taenM2cXc4bXVCcTA)
24. Families from Spinors (with A. Zee), *Phys. Rev. D* **25,** 553 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSHFFZnRORDZSRXM)
25. Supersymmetry and the Scale of Unification (with S. Dimopoulos and S. Raby), *Phys. Rev.*

 *D* **24,** 1681 (1981). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabndKc0xmS29PVEE)

1. Fractional Charge on Solitons (with J. Goldstone), *Phys. Rev. Lett.* **47,** 986 (1981). [PDF](https://drive.google.com/file/d/1UMjlSr8jrLFlojEWrRX4Wm5i5iPFoJoM/view?usp=sharing)
2. Supersymmetric Unified Models (with S. Dimopoulos), in *The Unity of the Fundamental In- teractions,* ed. A. Zichichi (Plenum, New York, 1983).
3. Physical Processes Involving Majorana Neutrinos (with L.F. Li), *Phys. Rev. D* **25,** 143 (1982).[PDF](https://drive.google.com/file/d/1VoriDcz3st2nTdMYIufjPwQSDeyUmWsZ/view?usp=sharing)
4. *Prospects at Higher Energy,* Isabelle Summer Study, 1981 (BNL Press, 1981). [PDF](https://drive.google.com/file/d/1heNlY2LugmwfRq5UbM-ktHF8Gttln4Kq/view?usp=sharing)
5. Coming Attractions in SUMS and Cosmology, *Comments on Nuclear and Particle Physics*

X175, (1981). [PDF](https://drive.google.com/file/d/1wDt4uwiqJiYpckhPQ-x1K4d1SEA2tc7d/view?usp=sharing)

1. Erice Lectures on Cosmology, in *The Unity of the Fundamental Interactions,* ed. A. Zichichi (Plenum, New York, 1983). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadlc2aXR1WkQ2eFk)
2. Naturality Problems, *APS Particles and Fields,* Santa Cruz, (1981), (APS Press). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taM3drWFRjc1VucjQ)
3. Magnetic Flux, Angular Momentum, and Statistics, *Phys. Rev. Lett.* **48,** 1144 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaXY4NDhFYk1kSDQ)
4. Remarks on Dyons, *Phys. Rev. Lett***. 48,** 1146 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacU5qV2NYTC1IYTg)
5. Proton Decay in Supersymmetry Theories (with S. Dimopoulos and S. Raby), *Phys. Lett.*

**B112,** 133 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRldva2hOMEQ0LVU)

1. Old and New Relics in Cosmology, *Proceedings NAS* **79,** 33376 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSjhULVJ6dkFtRWs)
2. QCD - The Modern Theory of Strong Interactions, *Ann. Rev. Nucl. Sci.* **V32***,* 177 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacG5LMVVqOEZPcTA)
3. *Microphysical Cosmology,* (in preparation, for Princeton University Press) [abandoned]
4. Some Recent Ideas Related to Supersymmetry, *Unified Theories and their Experimental Tests,* CLEUP, Padova, (1983). PDF
5. Reheating an Inflationary Universe (with A. Aubrecht, P. Steinhart and M. Turner) *Phys. Rev. Lett****.* 48,** 1437 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabEJQdmtadjBtT0E)
6. Might Our Vacuum be Metastable? (with M. Turner), *Nature* **298,** 633 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabnRqUExJYkw4NW8)
7. Monopole-Flux Tube Repulsion in Strong Coupling (with R. Zacher), *Phys. Rev. D* **26,** 3685 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVXU0SENGQ1NnLVk)
8. Boundness from below of the SU (5) Higgs Potential (with R. MacKenzie), *Phys. Rev. D* **26,** 3679 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ3c3a0d5Y1V2Qms)
9. Magnetic Monopoles: A Local Source? (with S. Dimopoulos, S. Glashow and E. Purcell),

*Nature* **298,** 824 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taV1NQWnU3ekpIUXc)

1. Quantum Mechanics of Fractional Spin Particles, *Phys. Rev. Lett.* **49,** 957 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTWdMWmxYTXlQUUU)
2. Catalyzed Nucleon Decay in Neutron Stars (with S. Dimopoulos and J. Preskill), *Phys. Lett.*

**B119,** 320 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYjBOa3NqdWZsaWs)

1. Cosmology of Invisible Axions (with J. Preskill and M. Wise), *Phys. Lett.* **B120,** 127 (1983). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taN3BpZl9rRWx2VTA)
2. Axions and Family Symmetry Breaking, *Phys. Rev. Lett.* **49,** 1549 (1982). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYVdBdXlLbTh6d00)
3. Particle Physics and Cosmology: Foundations and Working Pictures, in *The Very Early Universe,* eds. Gibbons, Hawking, Siklos. p. 2 (Cambridge University Press, 1983). [PDF](https://drive.google.com/file/d/1NrCwYuDH2SCth11JKUHyXO4xu7-Q0Vj7/view?usp=sharing)
4. Fun with Monopoles and Axions, in *The Very Early Universe,* eds. Gibbons, Hawking, Siklos p. 383-392 (Cambridge University Press, 1983). [PDF](https://drive.google.com/file/d/1dLPhldA0t0b2Px_XbogFA9ZDAjjqzTvJ/view?usp=sharing)
5. Conference Summary, in *The Very Early Universe,* eds. Gibbons, Hawking, Siklos. P. 484 (Cambridge University Press, 1983).
6. Review of “Quantum Physics” by J. Glimm and A. Jaffe, *Phys. Today,* October 1982. [PDF](https://drive.google.com/file/d/11g8rRui9eC-FsHmJLl4hCAP30OE8fH3k/view?usp=sharing)
7. Peculiar Quantum Numbers (in preparation, for Cambridge University Press) [abandoned]
8. Family Symmetries, *AIP Conference Proceedings No.* 102, p. 68, (*AIP Press,* 1983). [PDF](https://drive.google.com/file/d/1L2lGnOGzOyDUuo_pJLDZ5b_n7z6g_m8q/view?usp=sharing)
9. Thoughts on Family Symmetries, *AIP Conference Proceedings* No. 96 (*AIP Press,* 1982).[PDF](https://drive.google.com/file/d/1RomsrEvZ-PHmC4PsK3x8smrgMyWVirYl/view?usp=sharing)
10. Microphysical Cosmology, XVIII Solvay Conference, *Phys. Reports* **C104,** 143 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeHRKUDFkclc3Q2s)
11. Formation of Structure in an Axion-Dominated Universe (with M. Turner and A. Zee), *Phys. Lett.* **B125,** 35, 519(E) (1983). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taM1Y2THRyMVVBYXM)
12. Particle-Antiparticle Annihilation in Diffuse Motion (with D. Toussaint), *Jour. Chem. Phys.*

**78,** 2642 (1983).

1. Linking Numbers, Spin, and Statistics of Solitons (with A. Zee), Phys. Rev. Lett. 51, 2250 (1983). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taam5yUjlUYm81TXc)
2. Remarks on the Chiral Phase Transition in Chromodynamics (with R. Pisarski), *Phys. Rev.*

*D* **29,** 338 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ1ZlOXdtR3RwaW8)

1. New Macroscopic Forces? (with J.E. Moody), *Phys. Rev. D***30,** 130 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVW5nVFhzX1MtdEE)
2. The U(1) Problem: Instanton, Axions, and Familons, in *How Far Are We from the Gauge Forces?*

 ed. A. Zichichi (Plenum, 1985).

1. Statistical Mechanics of Anyons (with D. Arovas, J.R. Schrieffer and A. Zee), *Nucl. Phys.*

**B251** [FS13], 917 (1985). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVzdvOWFDZEQtN1k)

1. Solitons in Superfluid 3*He*-*A*: Bound States on Domain Walls (with J.L. Ho, J.R. Fulco and

J.R. Schrieffer), *Phys. Rev. Lett.* **52,** 1524 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVEhwTTNlaS1mdTg)

1. Reflections on Mirror Fermions (with G. Senjanovic and A. Zee), *Phys. Lett.* **B141,** 389 (1984). [PDF](https://drive.google.com/file/d/1NREdFNsh9AvYq-73e7n_lNB-PcJR22ra/view?usp=sharing)
2. Illustrations of Vacuum Polarization by Solitons (with R. MacKenzie), *Phys. Rev. D* **30**, 2194 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taam51UzFJbm1LUEU)
3. Examples of Vacuum Polarization by Solitons (with R. MacKenzie), *Phys. Rev. D* **30**, 2260 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSmVTaVJMZk1PRGM)
4. Appearance of Gauge Structures in Simple Dynamical Systems (with A. Zee), *Phys. Rev. Lett.*

**52,** 2111 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taV1NscEpEdGdXRUk)

1. Fractional Statistics and the Quantum Hall Effect (with D. Arovas and J.R. Schrieffer), *Phys. Rev. Lett****.* 53,** 722 (1984). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUldSMXloRTlialk)
2. A Stellar Loss Mechanism Involving Axions (with L. Krauss and J. Moody), *Phys. Lett.* **B144,** 391 (1984).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVlRyc2ctQVNfMGc)
3. Possible Form of Vacuum Deformation by Heavy Particles (with R. MacKenzie and A. Zee),

*Phys. Rev. Lett.* **53,** 2203 (1983).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVVlYT1ZFVmVCb28)

1. Possible Interpretation of a New Resonance at 8*.*3 GeV(with K. Lane and S. Meshkov), *Phys. Rev. Lett.* **53,** 1718 (1984). [PDF](https://drive.google.com/file/d/1aB6Ge0fojHtSw7vV9oZ8oJ-F5WqRYiIs/view?usp=sharing)
2. Adiabatic Methods in Field Theory, in *TASI Lectures in Elementary Particle Physics*, ed. Williams (TASI Publications, Ann Arbor, MI, 1984).
3. Inhomogeneous Cosmology and Microphysics, in *TASI Lectures in Elementary Particle Physics*, ed. Williams (TASI Publications, Ann Arbor, MI, 1984).
4. Bolometric Detection of Neutrinos (with B. Cabrera and L. Krauss), *Phys. Rev. Lett****.* 55,** 25 (1985). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVFVSSWpvRHI2Z0U)
5. Solar Neutrino Oscillations (with L. Krauss), *Phys. Rev. Lett.* **55,** 122 (1985). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadFU5TUlQeHFzVEU)
6. Fundamental Physics, Mathematics, and Astronomy, in *Emerging Syntheses in Science*, ed. Pines (Santa Fe Institute, 1985). [PDF](https://drive.google.com/file/d/1v6kJJEFF0TlRdANrwrPm2slmWlEFVTNR/view?usp=sharing)
7. Solar System Constraints and Signatures for Dark Matter Candidates (with L. Krauss and M. Srednicki), *Phys. Rev. D* **33,** 2079 (1986). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNG52bEN0ZV9NVms)
8. Calculations for Cosmic Axion Detection (with L. Krauss, J. Moody and D. Morris), *Phys. Rev. Lett.* **55,** 1797 (1985). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUThCT211bGV2MVU)
9. Resonant Production and Charm Showers in Ultra-High Energy Neutrino Interactions, *Phys. Rev. Lett.* **55,** 1252 (1985). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQVVmSnJidnl0LTA)
10. Simple Realizations of Magnetic Monopole Gauge Fields: Diatoms and Spin Procession (with

J. Moody and A. Shapere), *Phys. Rev. Lett.* **56,** 893 (1986). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRXRTblJmTFdrOVE)

1. A Short-Lived Axion Variant (with L. Krauss), *Phys. Lett.* **B173,** 189 (1986). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVmNfTlc2c2o3WEk)
2. Macroscopic *T* -Violation: Prospects for a New Experiment (with W. Bialek and J. Moody),

*Phys. Rev. Lett.* **56,** 1623 (1986). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVllRN190OS14Q0E)

1. *Longing for the Harmonies*, [a book] W.W. Norton (January, 1988).
2. “Virtual Particles” [a sonnet] Norton Anthology of Light Verse, ed. Baker, 1986.
3. Artificial Vacuum for *T* -Violation Experiment (with C. Pryor), *Phys. Lett.* **B194,** 137 (1987).
4. New Quarks and Neutrino Counting Below the *Z* Threshold (with L. Krauss), *Phys. Lett.*

**B181,** 380 (1986). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZHBjLTYydmJJdVk)

1. Compactification of the Twisted Heterotic String (with V. Nair, A. Shapere and A. Strominger), *Nucl. Phys.* **B287,** 402 (1987). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taX2FZemJYc0c3UUU)
2. Geometry of Self Propulsion at Low Reynolds Number (with A. Shapere), *Jour. Fluid Mech.*

**198,** 557 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQUdBc3FZc2Y1R00)

1. Internal Representations for Associative Memory (with E. Baum and J. Moody), NSF-ITP- 86-138, *Biol. Cybernetics***59**, 217 (1988).
2. Two Applications of Axion Electrodynamics, *Phys. Rev. Lett****.* 58,** 1799 (1987). [PDF](https://drive.google.com/file/d/1qxYDwgzYwuyPJrKfnuX-7hsi2N1itFoF/view?usp=sharing)
3. Efficiencies of Self-Propulsion at Low Reynolds Number (with A. Shapere), *Jour. Fluid Mech.*

**198**, 587 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUlIwWXcwaW9UT0E)

1. Self-Propulsion at Low Reynolds Number (with A. Shapere), *Phys. Rev. Lett****.* 58,** 2051 (1987). [PDF](https://drive.google.com/file/d/1bixqogBm2QUgYAqW2niXjYRJp4kPxMBl/view?usp=sharing)
2. Lattice Fermions, *Phys. Rev. Lett.***59,** 2397 (1987). [PDF](https://drive.google.com/file/d/1J7vhun-aW4kYcQGYCYiT43AS0p1nYtOM/view?usp=sharing)
3. Supervised Learning of Probability Distributions by Neutral Networks (with E. Baum), *Neural Information Processing*, ed. D. Anderson, *AIP Press*, 52-61 (1988). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ0txOGlGQmh5dW8)
4. A Modern Look at Newton’s Final Queries in *Action and Reaction: Proceedings of a Symposium to Commemorate the Tercentary of Newton’s Principia* ed. P. Theerman, A. Seeff *(University of Deleware Press, 1993) (Book).* [PDF](https://drive.google.com/file/d/1uOxWaNCXsHtxBpFBRwleU-nIEkOQ3jCJ/view?usp=sharing)
5. Gauge Kinematics of Deformable Bodies (with A. Shapere), *Am. J. Phys.***57,** 514 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSlVVWUVRa0xoemM)
6. Peculiar Spin and Statistics in 2+1 Dimensions (with R. MacKenzie), *Int. J. Mod. Phys.* **A3**, 2827 (1988). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNjR1RmxvUHdfOEU)
7. Geometric Phases in Physics (a text and reprint volume, edited with A. Shapere) (World Scientific, 1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaHlDNmpIUE1vVE0)
8. Self-Dual Models with *θ* Terms (with A. Shapere), *Nucl. Phys. B* **320,**669 (1989). [PDF](https://drive.google.com/file/d/1e3RamTzKPOX14CrvuyErXKjWPolkWH2d/view?usp=sharing)
9. Field Corrections to Induced Statistics (with A. Goldhaber, R. MacKenzie), *Mod. Phys. Lett.*

**A4,** 21 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaEd5bjdQTGczMms)

1. Possible New Form of Spontaneous *T* Violation (with J. March-Russell), *Phys. Rev. Lett.* **61,** 2066 (1988). [PDF](https://drive.google.com/file/d/1R-k4lbOWI9Ag6iEMSo7dlXRuxYxxNqsX/view?usp=sharing)
2. Induced Quantum Numbers in Some 2 + 1 Dimensional Models (with Y.-H. Chen), *Int. J. Mod. Phys. B***3,** 1 (1989), Abstract: *Int. J. Mod. Phys.* **A4**, 493 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZFA3QjdyVThYYzA)
3. Aharonov-Bohm Interaction of Cosmic Strings with Matter (with M. G. Alford), *Phys. Rev. Lett.* **62,** 1071 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSTFTcjdsMy13VGs)
4. Chiral Spin States and Superconductivity (with X.G. Wen, A. Zee), *Phys. Rev.* **B39,** 11413 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUy1XdlhiWTJLa3M)
5. Discrete Gauge Symmetry in Continuum Theories (with L.M. Krauss), *Phys. Rev. Lett.* **62,** 1221 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taU3RYMDFNWVEzeHM)
6. Gauge Theory of Deformable Bodies, in *Proceedings of IUPAM Swansea Conference*, pp. 220-233 ed. B. Simon A. Truman and I.M. Davies (Adam Hilger, Bristol and NY, 1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMjVjQjB1bGlTUjQ)
7. Gauge Theories of Swimming, *Phys. World 2,* **36**(1989). [PDF](https://drive.google.com/open?id=1ZrI4qb4X03gfRtcyYmEoXcm8XBDO3hmf)
8. Adiabatic Effective Lagrangians (with J. Moody and A. Shapere), in *Geometric Phases in Physics*, by A. Shapere and F. Wilczek **5** (World Scientific, Singapore, 1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadFBJUW55OGo2SDA)
9. Enhanced Baryon Number Violation Around Cosmic Strings (with M. Alford and J. March- Russell), *Nucl. Phys.* **B328,** 140 (1989).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRzhqdDJWZHoycjQ)
10. On Anyon Superconductivity, (with Y-H. Chen, E. Witten and B. Halperin), *Int’l. Jour. Mod. Phys.* **B3,** 1001 (1989).
11. Hydrodynamic Relations in Superconductivity, (with M. Greiter and E. Witten), *Mod. Phys. Lett.* **B3,** 903 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taU1gwZElNd29GXzg)
12. Consequences of Time-Reversal-Symmetry Violation in Models of High *T*c Superconductors, (with B.I. Halperin and J. March-Russell), *Phys. Rev.* **B40,** 8726 (1989). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadDlOa3FNSkNwS2s)
13. Lectures on Fractional Statistics and Anyon Superconductivity, in *Anomalies, Phases, Defects* ed. M. Bregola, G. Marmo and G. Morandi (Bibliopolis, 1989).
14. Discrete Quantum Hair on Black Holes and the Nonabelian Aharanov-Bohm Effect, (with M. Alford and J. March-Russell), *Nucl. Phys.* **B337,** 695 (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taU2szb1gzMWpxMWM)
15. The Interactions and Excitations of Nonabelian Vortices (with M. Alford, K. Benson, S. Coleman and J. March-Russell), *Phys. Rev. Lett.* **64,** 1632 (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeVAxSVRITjJ6Nkk)
16. Spontaneous Fact Violation (with S. Giddings), *Int. J. Mod. Phys.* **A5,** 635 (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taLWllM1VaWnJDbTQ)
17. Space-Time Approach to Holonomy Scattering (with Y.-S. Wu), *Phys. Rev. Lett*. **65,** 13 (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacS00c0tzQjBMQWs)
18. Zero Modes of Non-Abelian Vortices (with M. Alford K. Benson, S. Coleman, and J. March- Russell), *Nucl. Phys.* **B349,** 414 (1991). [PDF](https://drive.google.com/file/d/1ucsYB1MkCI-CwM6TPJLrClJkMePevCnd/view?usp=sharing)
19. Infrared Behavior at Negative Curvature (with C. Callan), *Nucl. Phys.* **B340,** 366 (1990).[PDF](https://drive.google.com/file/d/19FnBF0lfwYlPYzJeiHPU2FV7FJPvjkcq/view?usp=sharing)
20. Some Global Problems in Gauge Theories (Variations on a Theme of Aharonov and Bohm), in *Quantum Coherence* (World Scientific, 1990).
21. Heuristic Principle for Quantized Hall States (with M. Greiter), *Mod. Phys. Lett.* **B4,** 1063 (1990). [90/35]
22. States of Anyon Matter, *Int’l. Jour. of Mod. Phys.* **B5,** 1273 (1991). [90/29]
23. Fractional Statistics and Anyon Superconductivity, a monograph and reprint collection, World Scientific (September, 1990).
24. Anomalous Dimensions of Anisotropic Gauge Theory Operators (with D. Robertson), *Phys. Lett****.* B251,** 434 (1990).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYkdzd3VqZWc3Zlk)
25. Positron Line Radiation as a Signature of Particle Dark Matter in the Halo (with M.S. Turner),

*Phys. Rev. D* **42,** 1001 (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWWVUTGhJdGFubFE)

1. Perspectives on Particle Physics and Cosmology, Physica Scripta T36, 281 (1991), invited talk at Nobel Symposium #79: “The Birth and Early Evolution of Our Universe,” Gra¨fta˙vallen, O¨stersund, Sweden, 6/90. [90/64] [PDF](https://drive.google.com/file/d/1IJunJh5JHjDeTfeVx13sVUyIGmGdqYdk/view?usp=sharing)
2. Inflationary Axion Cosmology (with M.S. Turner), *Phys. Rev. Lett.* **66,** 5 (1991). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRUFzM3VMQldGdG8)
3. Fractional Quantum Numbers: A Conceptual Introduction, Trends in Theoretical Physics, Vol. 2, P. Ellis, Y. Tang, eds. (Addison-Wesley, 1991). [90/74]
4. Relic Gravitational Waves and Extended Inflation (with M.S. Turner), *Phys. Rev. Lett.* **65,** 3080 (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacGNQZHpmWHNYZW8)
5. Anyons for Anyone, *Phys. World 4,* **40** (1990). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tad3l0SW9aZ1BOSnM)
6. Cosmological Implications of Axinos (with K. Rajagopal and M.S. Turner), *Nucl. Phys.* **B358,** 447 (1991). [90/79] [PDF](https://drive.google.com/file/d/1G4epRHHK3d35X2VigP4EQFewS-PR7Oo9/view?usp=sharing)
7. Anyons, *Scientific American* ***264,***#5, p. 58 (May, 1991). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tad3l0SW9aZ1BOSnM)
8. Cosmology and Broken Discrete Symmetry (with S. Trivedi, J. Preskill and M.B. Wise), *Nucl. Phys.* **B363,** 207 (1991). [91/11] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taekpkNllIUHV5cDQ)
9. Dynamical Effect of Quantum Hair (with S. Coleman and J. Preskill), *Int’l. Jour. Mod. Phys. Lett.* **A6,** 1631 (1991). [91/17] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQS1hLU9pOEtjdk0)
10. Paired Hall State at Half Filling (with M. Greiter and X.G. Wen), *Phys. Rev. Lett.* **66,** 3205 (1991) [91/18] [PDF](https://drive.google.com/file/d/10mkxxqevb_PBonbJUYVT9u1wUSEkCb-z/view?usp=sharing)
11. Growing Hair on Black Holes (with J. Preskill and S. Coleman), *Phys. Rev. Lett.* **67,** 1975 (1991).

[91/32] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZVlrQk5QdlEzNkE)

1. Dual Dilaton Dyons (with A. Shapere and S. Trivedi), *Mod. Phys. Lett.* **A6,** 2677 (1991). [91/33] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSTRsb1pLQjZ1NXc)
2. Limitations on the Statistical Description of Black Holes (with P. Schwarz, A. Shapere and S. Trivedi), *Mod. Phys. Lett.* **A6,** 2353 (1991). [91/34] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tad1JORHdKWXZXbVU)
3. Exact solutions and the adiabatic heuristic for quantum Hall states (with M. Greiter), *Nucl. Phys.* **B370,** 577 (1992). [91/45] [PDF](https://drive.google.com/file/d/10-guN_cXLOTpyFAuypo3wwDEpU4f7JQe/view?usp=sharing)
4. Unification of Couplings, (with S. Dimopoulos and S. Raby), *Physics Today* **44,** October 1991, p.25. [91/63] [PDF](https://drive.google.com/file/d/1im_QXTKjuEZu-qCyMHi1ITQFLvrR3L0F/view?usp=sharing)
5. Quantum Hair on Black Holes (with S. Coleman and J.Preskill), *Nucl. Phys.* **B378,** 175 (1992). hep-th/9201059 [91/64] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaktIOEhYU1E3bDg)
6. Paired Hall States (with M. Greiter and X.G. Wen), *Nucl. Phys.* **B374,** 567 (1992). [91/66] [PDF](https://drive.google.com/file/d/1djtM7EHFRNq0D1V8HNCMHST5tcOcPlZi/view?usp=sharing)
7. Review of “Niels Bohr’s Times,” *Science* **225,** 345, (1991). [91/78] [PDF](https://drive.google.com/file/d/1mpPfTRRaLDFzXVjhTgWjMtnOzSdtJSmU/view?usp=sharing)
8. Disassembling Anyons, *Phys. Rev. Lett.* **69,** 132 (1992). [91/70] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadi1iRjBmNHZPcU0)
9. Black Holes as Elementary Particles (with C.F.E. Holzhey), *Nucl. Phys.* **B380,** 447 (1992). hep-th/9202014 [91/71] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadlRHRUhPZC1OTjA)
10. Internal Frame Dragging and a Global Analogue of the Aharonov-Bohm Effect (with J. March- Russell and J. Preskill), *Phys. Rev. Lett.* **68,** 2567 (1992). hep-th/9112054 [91/92] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacjJxWXpDU3NSLVU)
11. Quantum Mechanics, article in *World Book Encyclopedia.* [92/2]
12. Paired Hall States in Double Layer Electron Systems (with M. Greiter and X.G. Wen), *Phys. Rev.* ***B46,*** *9586, (1992*). [92/1] [PDF](https://drive.google.com/open?id=1LLxnASarLboA1bs3XeCNZKa3V3DscgUy)
13. Application of the Renormalization Group to a Second Order QCD Phase Transition, *Int. Jour. Mod. Phys****.* A7,** 3911 (1992). [91/65] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMXVPRm9WaUlOTVk)
14. Remarks on the Phase Transition in QCD, in *Proceedings of the IFT Conference on Dark*

*Matter,* *Int. J. Mod. Phys. D,***03,** 63 (1994).

1. QCD and Asymptotic Freedom: Perspectives and Prospects *Proceedings of Aachen “20 Years of QCD” Conference,* ed. P. Zerwas and H. Kastrup, pp. 16-39 (World Scientific, Singapore), June 1992 and *Int’l Jour. Mod. Phys.* **A8** 1359 (1993). hep-ph/9211290 [92/79] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYjExM1FaUVVNUlk)
2. The End of Physics?, *Discover* March 1993, 30.
3. Quantum Purity at a Small Price: Easing a Black Hole Paradox, *Proceedings of Houston Conference on Black Holes*, ed. S. Kalara and D. Nanopoulos, pp. 1-21 January 1992, (World Scientific, Singapore) . hep-th/9302096 [93/12] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTjA3ejJrY1JmSGM)
4. Static and Dynamic Critical Phenomena at a Second Order QCD Phase Transition (with Krishna Rajagopal) *Nucl. Phys.* **B399** 395 (1993). hep-ph/9210253 [92/60] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaGYxUkZPUXRkLVU)
5. Lectures (1-4) on Black Hole Quantum Mechanics, *The Black Hole 25 Years After,* eds. C. Teitelboim and J. Zanelli, *World Scientific,* pp. **336** (June 1998). [PDF](https://drive.google.com/file/d/13df2Rdvt2n6Fm4SWJZ37iymcJtA24cHh/view?usp=sharing)
6. A Philosopher in Spite of Himself (Review of *Dreams of a Final Theory*, S. Weinberg) *Physics Today,* April 1993[. PDF](https://drive.google.com/file/d/1w66U9kVvUGLTw3TK7fy8akGef665Eg63/view?usp=sharing)
7. Emergence of Coherent Long Wavelength Oscillations After a Quench: Application to QCD, (with Krishna Rajagopal), *Nucl. Phys.* **B404** 577 (1993). hep-ph/9303281 [93/16] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVm1HczVwWXJnM1k)
8. Beyond the Standard Model, *Proceeding of Texas/PASCOS 1992,* Berkeley, November 1992,

Annals of NYAS **V688**, pp. 94-112 (1993). hep-ph/9304318 [93/23] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNklfeUdNM2RMQ1U)

1. Liberating Exotic Slaves, in *Quantum Coherence and Reality* Proceedings of Aharonov’s 60th Birthday, ed. J. Anandan, J. Safko (World Scientific, Singapore, 1995). cond-mat/9408100 [94/58] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMXlHclhPTFE5eTA)
2. Fractional Statistics and Spin Charge Separation in 2+1 Dimensions (with M. Greiter and Z. Zhou). (unpublished)
3. 1012Degrees in the Shade (preprinted as “Hot Stuff: The High Temperature Frontier”), *The Sciences,* January/February 1994, 22. [93/50] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUHJycXNfSjNPTnc)
4. Geometric and Renormalized Entropy in Conformal Field Theory, (with C. Holzhey and F. Larsen), *Nucl. Phys.* **B424** 443 (1994). hep-th/9403108 [93/88] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taekdzeWduZkFIRnc)
5. Remarks on Hot QCD, in Proceedings of Quark Matter ‘93, Borlange, Sweden, June 1993 and

*Nucl. Phys* **A566**  123c (1994). hep-ph/9308341 [93/48[] PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUjZ5LVVrRWpEVU0)

1. Status of QCD, Proceeding of Lepton-Photon Conference, ed. P. Drell and D. Rubib, pp. 593-619, Cornell University, Ithaca, NY, August 1993, *(AIP Press).* hep-ph/9311302 [93/69] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTUl3WWd4dmU2UHc)
2. Non-Fermi Liquid Fixed Point in 2+1 Dimensions, (with Chetan Nayak), *Nucl. Phys.* **B417,** 359 (1994). cond-mat/9312086 [93/89] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabDFSaXlTNUZVaVE)
3. On Geometric Entropy, (with Curtis Callan), *Phys. Lett.* **B333,** 55-61 (1994). hep-th/9401072 [93/87] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadkVER1ktelFBcDQ)
4. Exclusion Statistics: Low Temperature Properties, Fluctuations, Duality, Applications, (with C. Nayak), *Phys. Rev. Lett.* **73,** 2740 (1994). cond-mat/9405017 [94/25] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabW4zbThpdGRWVFE)
5. Renormalization Group Approach to Low Temperature Properties of a Non-Fermi Liquid Metal, (with C. Nayak), *Nucl. Phys.* **B430,** 534 (1994). cond-mat/9408016 [94/59] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taOHFhR3liX1BiMUk)
6. Statistical Transmutation and Phases of Two-Dimensional Quantum Matter, in Proceedings of 150th Anniversary of Boltzmann’s Birth, Academi Lincei, Rome. cond-mat/9509085 [95/71][PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaFItM0dHRGw4ZkE)
7. Some Applications of a Simple Stationary Line Element for the Schwarzschild Geometry, (with P. Kraus), *Mod. Phys. Lett.* **A9,** 3713 (1994). gr-qc/9406042 [94/46] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYURVWmJzY0JvNHc)
8. Self-Interaction Correction to Black Hole Radiance, (with P. Kraus), *Nucl. Phys.* **B433,** 403 (1995). gr-qc/9408003 [94/61] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQkVDeGhGY2NrNU0)
9. Geometric Entropy, Wave Functionals, and Fermions (with F. Larsen), *Annals of Physics,* **243,** 280 (1995). hep-th/9408089 [94/51] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadENMemdOaWRhelk)
10. Effect of Self-Interaction on Charged Black Hole Radiance (P. Kraus), *Nucl. Phys.* **B437**

231 (1995). hep-th/9411219 [94/101] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacExhQk5UX21CTjA)

1. Spin, Electron Spin, Spin and Statistics, and Fermions and Bosons. *Macmillan Encyclopedia of Physics,* **1996** Edition, p. 1509-1511; 1511-1513; 1513-1514; and 547-549.
2. Symmetry Laws (Physics), Vol. 18, p. 89; Symmetry Breaking, Vol. 18, p. 86; Anyons, Vol. 1,

p. 807; Geometric Phase, Vol. 8, p. 53; and Conservation Laws, Vol. 4, p. 368. McGraw-Hill *Encyclopedia of Science & Technology,* (**8th** Edition, 1997).

1. Review of Penrose’s “Shadows of the Mind”. *Science,* **266,** 1737 (1994). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVktHQVZXZHkwZk0)
2. Space-Time Aspects of Quasiparticle Propagation (with R. Levien and C. Nayak) *Int. J. of Mod. Phys.* **B9,** 3189 (1995). cond-mat/9501050 [94/108] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNGZBNmtXNExrZVE)
3. Quantum Hall States of High Symmetry (with C. Nayak), *Nucl. Phys.* **B450*,***558 (1995). cond-mat/9501052 [94/109] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSW9OVUZCU0pBR3M)
4. Physical Properties of Metals from a Renormalization Group Standpoint (with C. Nayak),

*International Jour. of Mod. Phys.* **B10,** 847 (1996). cond-mat/9507040 [94/60] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMHp3T0hrLUtuOGM)

1. Asymptotic Freedom, Lecture on receipt of the Dirac Medal, published by *ICTP,*

Trieste, Italy (1994). Princeton, N.J.: Institute for Advanced Study, 09/1996. Report no. 000067401

IASSNS-HEP 96-92 arXiv: hep-th/9609099. [PDF](https://drive.google.com/file/d/1FoOLvvjKZ0TqiKyCh4ua2U7gY0qEFO0f/view?usp=sharing)

1. From the Standard Model to Dark Matter, (invited talk at 5th Annual October Maryland

Astrophysics Conference), published in conference proceedings, *AIP Conference Proceedings* **336,**

 Issue 01. hep-ph/9501343v1. [PDF](https://drive.google.com/file/d/1ws-Pss1BbhjsvVpJS996EByXhxRs8g2Y/view?usp=sharing)

1. Realization of the Fredkin Gate Using A Series of One- And Two-body Operators, (with H.F. Chau), *Phys. Rev. Lett* **75** 748 (1995). quant-ph/9503005 [95/15] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUUdMcDB6WXh3cVU)
2. Quantum Numbers of Hall Effect Skyrmions (with C. Nayak), cond-mat/9505081 [95/35] (Superseded by Quantum Numbers of Textured Hall Effect Quasiparticles, Item 222, [95-104]) [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSWNWcUdhc1JGTjA)
3. Indirect Neutrino Oscillations (with K.S. Babu and Jogesh Pati) *Phys. Lett.* **B359,**351 (1995). hep-ph/9505334 [95/37] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRTBHOW0xcnhqU28)
4. Renormalization of Black Hole Entropy and of the Gravitational Coupling Constant (with F. Larsen), *Nucl. Phys.* **B458,** 249 (1996). hep-th/9506066 [95/49] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWGNwRXk0V3AtUHc)
5. Spin-Singlet to Spin Polarized Phase Transition at ν = 2/3: Flux-Trading in Action (with C. Nayak), *Nucl. Phys.* **B455,** 493 (1995). cond-mat/9507016 [95/59] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVm1QZEFUaTRueFE)
6. Spin-Singlet Ordering Suggested by Repulsive Interactions (with C. Nayak), cond-mat/9510132 [95/75] (See Possible Electronic Structure of Domain Walls in Mott Insulators, Item 225, [95-111]) [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaXN5SGFTQXRNanM)
7. Internal Structure of Black Holes (with F. Larsen), *Phys. Lett* **B375,** 37 (1996). hep- th/9511064 [95/92] [PDF](https://drive.google.com/file/d/1UcQNs1i26ZOvEJJik5r9-UhrxYrXdHdL/view?usp=sharing)
8. Remarks on the Phase Structure of QCD, Particle Theory and Phenomenology Proceedings, Iowa State University, May 1995, ed. Lassila, et al., pg. 47, (*World Scientific,* Singapore). [95/103]
9. Quantum Numbers of Textured Hall Effect Quasiparticles (with C. Nayak), *Phys. Rev. Lett.*

**77,** 4418(1996). cond-mat/9512061 [95/104] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVlkwNnlCOTBuVVk)

1. Aspects of d-Density Order, *Proceedings of Pacific Conference on Condensed Matter*

*Theory:* *Complex Materials and Strongly Correlated Systems,* Seoul, Korea, Dec. 2-5, 1995

[95/110], cond-mat/9512156 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMmJHenFhWXlFbFk)

1. QCD Interference Effects of Heavy Particles Below Threshold (with P. Kraus), *Phys. Lett.* **B382,** 262 (1996). hep-ph/9601279 [96/04] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSEo0N2wwLWw5QWs)
2. Possible Electronic Structure of Domain Walls in Mott Insulators (with C. Nayak), *Int. J. Mod. Phys.* **B10,** 2125 (1996). cond-mat/9602112 [95/111] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVWZXRndWVEI2WE0)
3. A crack in the Standard Model?, *Nature* Vol. **380**, 19-20 (7 March 1996). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taOHhacmk3WTFRdDQ)
4. Remarks on the Current-Carrying State of Hall Superfluids, Proceedings of 1st Jagna Inter-

national Workshop on Advances in Theoretical Physics, Jagna, Bohol, Philippines, January 1995

[96/28], cond-mat/9604007 [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSFRzY1F3MXhZRk0)

1. Classical Hair in String Theory I: General Formulation (with F. Larsen), *Nucl. Phys.* **B475,** 627 (1996). hep-th/9604134 [96/35] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNDFVcmR1aWR0SGs)
2. 2n Quasihole States Realize 2n−1-Dimensional Spinor Braiding Statistics in Paired Quantum

Hall States (with Chetan Nayak), *Nucl. Phys.* **B479,** 529 (1996). cond-mat/9605145 [96/52] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUlRXeDBoVktNUG8)

1. Experimental Consequences of a Minimal Messenger Model for Supersymmetry Breaking, (with K.S. Babu and C. Kolda), *Phys. Rev. Lett.* **77,** 3070 (1996). hep-ph/9605408 [96/55] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadzB6MVdfelZWOWM)
2. Particle Physics for Cosmology, Published in “Critical Dialogues in Cosmology” in celebration of the 250th Anniversary of Princeton University, 24-27 June 1996. Ed. Neil Turok (*World Scientific,* Singapore). hep-ph/9608285 [96/79] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZXVOcC16SmdITUk)
3. Classical Hair in String Theory II: Explicit Calculations (with F. Larsen), *Nucl. Phys.* **B488,** 261 (1997). hep-th/9609084 [96-92] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQjQtMGxVMzhsb1E)
4. Populated Domain Walls (with C. Nayak), *Phys. Rev. Lett.,* **78 ,** 2465 (1997). cond- mat/9609094 [96/93] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeFF4X1pGNFpkNkU)
5. From Asymptotic Freedom to Unification to Supersymmetry (and Beyond), chapter in, *Physics in 2000 And Beyond* published by *World Scientific Publishing Co. (UK) Ltd.* [96-94]
6. Asymptotic Freedom, Lecture on receipt of the Dirac Medal, October 1994, published by *ICTP,* Trieste, Italy. hep-th/9609099 [96-95] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNmtIb0FTSnFWSU0)
7. Resolution of Cosmological Singularities (with Finn Larsen), *Phys. Rev.* **D 55,** 4591 (1997). hep-th/9610252 [96-108] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZy1wUjVXcktGSW8)
8. Review of “In Search of the Ultimate Building Blocks” by G. ’tHooft, *Nature* **385,** 217 (16 Jan. 1997). [96-131] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQk83WFRWQzl0Ync)
9. The Future of Particle Physics as a Natural Science, Published in “Critical Problems in Physics” in celebration of the 250th Anniversary of Princeton University, November 1996, eds. Fitch, Marlow, and Dementi, Princeton University Press; also in Int. Jour. Mod. Phys. A 13, 863, (1998); also in *Magazine of Physics, Science & Ideas* **Vol. 1 No. 2**) 12-25, (Dec. 1996). hep-ph/9702371 [97-11] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadERRZnN1ZFZrTE0)
10. The Future of Particle Physics, in Proceedings of the 11th Nishinomiya-Yukawa Memorial Symposium “Physics in the 21st Century”, ed. Kikkawa, Kunitomo, and Ohtsubo. (*World Scientific,* Singapore, 1996). [97-14]
11. Comments on the high-Q2 HERA anomaly (with Babu, Kolda, March-Russell). *Phys. Lett.*

**B402,** 367 (1997). hep-ph/9703299 [97/04] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRllPTnNjOG1fTEk)

1. Cross-Confinement in Multi-Chern-Simons Theories (with Lorenzo Cornalba), *Phys. Rev. Lett.* **78,** 4679 (1997). hep-th/9703131 [97/22] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMnh1ZjFvb2MxZkU)
2. Review of *“The Inflationary Universe”* by Alan Guth, Science 276, 1087 (16 May 1997). [97/43] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSVhPQjRLN2JubUk)
3. Review of *“The Fabric of Reality”* by David Deutsch, Physics World 51, (June 1997). [97/44] [PDF](https://drive.google.com/file/d/1ZrIM5A0_IKsmEfo_kJhyiogGz77Kpn6F/view?usp=sharing)
4. Mass Splittings from Symmetry Obstruction (with L. Cornalba), *Phys. Lett.* **B411,** 112-116 (1997). hep-th/9706014 [97-48] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeVpzLVNDYnZSNWM)
5. Some Examples in the Realization of Symmetry, *Nucl. Phys.* **B68** (Proc. Suppl.), 367 (1998). hep-th/9710135 [97/116] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tac2Nfbl9QcjQycHc)
6. Panning for Gold at the K Stream, *Nature* **389,** 671 (16 Oct. 1997). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYUotdGczcEdJRnc)
7. An Action for Black Hole Membranes (with M. Parikh), *Phys. Rev.* D **58,** 064011, (1998). gr-qc/9712077 [97-117] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacmxOaUlLektjVkE)
8. QCD at Finite Baryon Density: Nucleon Droplets and Color Superconductivity (with M. Alford and K. Rajagopal), *Phys. Lett.* **B422,** 247-256, (1998). hep-ph/9711395 [97/119] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNVVMUXhRSVRFUkU)
9. A Chern-Simons Effective Field Theory for the Pfaffian Quantum Hall State (with E. Fradkin, C. Nayak, and A. Tsvelik), *Nucl. Phys.* **B516,** 704-718 (1998). cond-mat/9711087 [97-120] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTFVicTBnSHZ5UEE)
10. Colour Takes The Field, *Nature* **390,** 659 (18/25 Dec. 1998). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaXFKcVpMano2V3M)
11. Neutrino Deficit Challenges Conservation Laws, *Nature* **391,** 123 (8 Jan. 1998). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tab3BlZ21NNjhuT0E)
12. Why are there Analogies between Condensed Matter and Particle Theory? *Physics Today,* **11**  (Jan. 1998). [PDF](https://drive.google.com/file/d/1vKpNhvir8m2cv7YdJfzsueO5sMTvbNju/view?usp=sharing)
13. Suggested New Modes in Supersymmetric Proton Decay (with K.S. Babu and J. Pati), Phys. Lett. B423, 337-347 (1998). hep-ph/9712307 [97/136] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRUpMSHYxOGMxOVU)
14. Riemann-Einstein Structure from Volume and Gauge Symmetry, *Phys. Rev. Lett.* **80,** 4851 (1998). hep-th/9801184 [97-142] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSzViWnZnamM5VFk)
15. Liberating Quarks and Gluons, *Nature,* **391** , 330-331 (22 Jan. 1998). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taem14LTZ1d3M2aFE)
16. Back to Basics at High Temperature, *Physics Today,* **11** (April 1998). [PDF](https://drive.google.com/file/d/15qfyO6Ip-nE_naGQEZHPKTuKP8YYBGpE/view?usp=sharing)
17. Beyond The Standard Model: An Answer and Twenty Questions, in Erice 1997: highlights for subnuclear physics, 50 years later 291-327 (1997). hep-ph/9802400 [98-10] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tad2l2VEVJSkNMZG8)
18. Color Superconductivity and Signs of Its Formation (with M. Alford and K. Rajagopal), in proceedings of Riken-BNL Workshop, November 1997. hep-ph/9802284 [98-13] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadWlwS3cxZEM2TFE)
19. Quantum Field Theory, in the American Physical Society Centenary issue of *Rev. Mod. Phys.* **71,** S85-S95 (1999); also in More Things in Heaven and Earth– A celebration of Physics at the Millennium ed. B. Bederson, (Springer-Verlag, New York), (1999). hep-th/9803075 [98-20] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMFJJN25qTjc0bUU)
20. CP Violation, Higgs Couplings, and Supersymmetry, (with K.S. Babu, C. Kolda and J. March- Russell), *Phys. Rev*. D **59,** 016004 (1999). hep-ph/9804355 [98/30] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMnU4V0E0ZEh4V28)
21. Color-Flavor Locking and Chiral Symmetry Breaking in High Density QCD (with M. Alford and K. Rajagopal) *Nucl. Phys.* **B537,** 443-458 (1999). hep-ph/9804403 [98-29] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZkJYNmQ2LWdVazg)
22. From Notes to Chords in QCD, in proceedings of “QCD at Finite Baryon Density” Conference, April 1998, Universitaet Bielefeld, Bielefeld, Germany, *Nucl. Phys.* **A642,** 1c-13c, (1998). [98-56] [PDF](https://drive.google.com/file/d/1HawlLkeSoNpfTRI9tVihm_mlWkxaUORz/view?usp=sharing)
23. Projective Statistics and Spinors in Hilbert Space (1998). hep-th/9806228 [98-61] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVFk4TWJGM3JUbUU)
24. Particle Physics: The Standard Model Transcended, *Nature* **394,** 13-15, (2 July 1998). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taM19EU25yRWJSLTA)
25. Global Structure of Evaporating Black Holes (with M. Parikh), *Phys. Lett.* **B449,** 24-29 (1999). gr-qc/9807031 [98-57] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabkV3aF9xVVFoYW8)
26. Imaginary Chemical Potential and Finite Fermion Density on the Lattice (with M. Alford and A. Kapustin), *Phys. Rev.* D **59,** 054502 (1999). hep-lat/9807039 [98-67] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNktjT0Itdy1BVmM)
27. Nuclear and Subnuclear Boiling, *Nature* **395,** 220-221 (17 September 1998).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZ3BEQndTS0tvMjg)
28. Beyond the standard model: *This time for real, in Proceedings of XVIII International Conference*

*on Neutrino Physics and Astrophysics,* Takayama, Japan, June 4-9, 1998, *Nucl. Phys. Proc. Suppl.*

**77,** 511-519 (1999). [PDF](https://drive.google.com/file/d/1HoWgo1kmazN6VArxe46OVnlyBEA9zHZ6/view?usp=sharing)

1. Fermion masses, neutrino oscillations, and proton decay in the light of SuperKamiokande (with

K.S. Babu and J. Pati), *Nuclear Physics* **B566,** 33-91 (2000) hep-ph/9812538 [98-80] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taR0xGRVBrMWZObGs)

1. High Density Quark Matter and the Renormalization Group in QCD with two and three flavors (with T. Scha¨efer), *Phys. Lett.* **B450,** 325-331 (1999). hep-ph/9810509 [98-90] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taejJSV3hRaEZsTzA)
2. Continuity of Quark and Hadron Matter, (with Thomas Scha¨efer), *Phys. Rev. Lett.* **82**

3956-3959 (1999). hep-ph/9811473 [98-100[] PDF](https://drive.google.com/file/d/1h610HkmEjT9ztRIq0ZP5LAXCMbDWUH2p/view?usp=sharing)

1. The Persistence of Ether, *Physics Today* **52,** 11-13 (January 1999). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaXE0ZWJNRzlHNlU)
2. The Long Life of a Thoughtful Teacher (Review of “Geons, Black Holes and Quantum Foam: A Life in Physics” by John A. Wheeler with K. Ford) *Science* **282**  (1998). [PDF](https://drive.google.com/file/d/14Z_6XW_pnYpS5panUuOV1P2MPZqTF-Ck/view?usp=sharing)
3. Getting Its from Bits *Nature* **397,** 303-306 (28 Jan. 1999). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNU5VN3RWUzYzLXM)
4. Reply in sonnet form, to Pinotti’s letter to the Editor regarding Numerical Simulation (Item 256.), 113 (March 1999). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ2lDamVFdmlHQmM)
5. Quark Description of Hadronic Phases (with T. Scha¨efer), *Phys. Rev. D* **60,** 074014 (1999). hep-ph/9903503. [99-32] [PDF](https://drive.google.com/file/d/1ke2qy-cNw43IbSDZkZrilMDpPoKRVR0S/view?usp=sharing)
6. Cosmic Molasses for Particle Masses, *New Scientist* No **2181,** 32-37 (10 April 1999).
7. Minimal Potentials with Very Many Minima (with Marin Soljaˇci´c). *Phys. Rev. Lett.* **84,** 2285- 2289 (2000) cond-mat/9904190 [99-39] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYlQtSklFM3VKdTg)
8. Reaching Bottom, Laying Foundations, *Nature* “A Celebration of Physics” (special issue for American Physical Society 100th anniversary), 4-5 (April 1999). [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tadmZLWndfbjJNenc/view?usp=sharing)
9. Superconductivity from perturbative one-gluion exchange in high density quark matter (with T. Schaefer) *Phys. Rev. D* **60,** 114033-1-114033-7 (1999). hep-ph/9906512 [99/58] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadHpyQ1FycVpqMWc)
10. And you’re glue *Nature* **400,** 21-23 (1 July 1999). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taM3pSMnJkNWZUNDQ)
11. What QCD tells Us about Nature-and Why We Should Listen, keynote talk at PANIC‘99, Uppsala, Sweden, June 10, 1999. *Nucl. Phys.* **A663 & 664,** 3c-20c (2000). hep-ph/9907340[99-64] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tacThjaGFxbVU0cmM)
12. The Recent Excitement in High -Density QCD, invited talk at PANIC ‘99, Uppsala, Sweden, June 1999. Nucl. Phys. **A663 & 664,** 257c-271c, (2000). hep-ph/9908480 [99-68] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUGpRRXpVaU45blU)
13. Reply to Walter L. Wagner, regarding Mukerjee’s Article on the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory [“A Little Big Bang,” March 1999], Letters to the Editors, *Scientific American*, 8, July 1999. [PDF](https://drive.google.com/file/d/1tNMFMpG-DG5c70ibfByzFC2CiyeQCzmt/view?usp=sharing)
14. Hawking Radiation as Tunneling, (with M. Parikh), *Phys. Rev. Lett.* **85,** 5042-5045 (2000) hep-th/9907001 [98-22] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWEQxMTFTd19jakU)
15. Review of Speculative “Disaster Scenarios” at RHIC (with W. Busza, R. L. Jaffe and J. Sandweiss), (Report of a Committee charged by Dr. John Marburger, Director of Brookhaven National Laboratory, to review potentially catatrophic processes that might be initated by heavy ion collisions at the Relativistic Heavy Ion Collider.) *Rev. Mod. Phys.* **72,** 1125-1140, (2000) hep-ph/9910333[99-87] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYVJHQW8xRXZBV3M)
16. QCD In Extreme Conditions, Lectures given at CRM Summer School, “Theoretical Physics at the End of the XXth Century,” June 27-July 10, Banff (Alberta), Canada. Published in *CRM* *Series in Mathematical Physics.* Saint-Aubin and Vinet, eds. (Springer) 567-636 (2000) hep-ph/0003183 [99-92] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUGotb3J0enJFQWc)
17. Mass without Mass I: Most of Matter, *Physics Today,* **52** (1999). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeEJpWkhaNElnQW8)
18. Maxwell’s Other Demon, *Nature* **402,** 22-23,(4 November 1999). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZVJrQnQyTjZJcGs)
19. Charged stripes from alternating static magnetic field, (with Oleg Tchernyshyov), *Phys. Rev.*

**B62,** 4208 (2000) cond-mat/9911347 [99-108] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWHdKNDkzZ2l0aU0)

1. Mass without Mass II: The Medium is the Mass-age, *Physics Today,* **13-14** (January 2000). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRDdrNWdKR2hmd2s)
2. Is the Sky made from Pi? (Review of two books, “Just Six Numbers: The Deep Forces that Shape the Universe” by Martin Rees; and “The Nine Numbers of the Universe” by Michael Rowan-Robinson) *Nature* **403,** 2479-248l (20 January 2000). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWnFFd2VKRTBMT1E)
3. Radical Conservatism and Nucleon Decay, Invited Lecture at NNN99 Workshop, September 23-25, 1999, at SUNY-Stony Brook, NY. Published in *AIP conference Proceedings of NNN99,* **62-73** (1999) . hep-ph/0002045 [00-99] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taenBfQjhfMmdMREU)
4. Backyard Exotica, *Nature* **404,** 452-45 (30 March 2000). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tac3ctVk5KRTZueG8)
5. Neutralino Dark Matter in Focus Point Supersymmetry (with J.Feng and K. Matchev), *Phys. Lett.* **B482,** 388-399 (2000) hep-ph/0004043 [00-24] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSEx4R2xGYy1XSFk)
6. Saltatory Relaxation of the Cosmological Term in String Theory, (with J. Feng, J. March- Russell and S. Sethi). *Nucl. Phys* **B602**, 307-328 (2001) hep-th/0005276 [00-25] [PDF](https://drive.google.com/file/d/1D1bTzw_fqp1Lkbcef0NW0V8CUOMJDs41/view?usp=sharing)
7. Weinberg on Supersymmetry; Another Landmark Work (Review of “The Quantum Theory of Fields, vol. 3: Supersymmetry” by Steven Weinberg) *Physics Today,* **53N555-56,** (May 2000). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tad1YwSDh3dkI5aWM)
8. QCD Made Simple, *Physics Today*, **53N8,** 22-28, (2000) [MIT-CTP-3114] [PDF](https://drive.google.com/file/d/1TqlXZMLRvvN63LdDFrGIdrFYs2LR5IMH/view?usp=sharing)
9. Prospects for Indirect Detection of Neutralino Dark Matter (with J. Feng and K. Matchev),

*Phys.Rev. D* **63,** 4502-4504 (2001). astro-ph/0008115 [00-55] [MIT-CTP-3115] [PDF](https://drive.google.com/file/d/1scB6TpvTFdk9VG6gLnl9SLpGyiajX1cB/view?usp=sharing)

1. Josephson Effect Without Superconductivity: Realization in Quantum Hall Bilayers, (with M. Fogler), *Phys. Rev. Lett*. **86,** 1833-1836 (2001). cond-mat/0007403 [MIT-CTP-3116] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taV2RjbUlGRFZPTTQ)
2. The Condensed Matter Physics of QCD, (with K. Rajagopal) in “Handbook of QCD”, ed. M. Shifman, *World Scientific,* **2016-2151 (2001).** hep-ph/0011333 [MIT-CTP-3049] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tac2NFdzdRQ2JiSU0)
3. Enforced Electrical Neutrality of the Color-Flavor Locked Phase (with K. Rajagopal), *Phys. Rev. Lett*. **86,** 3492-3495 (2001). hep-/0012039 [MIT-CTP-3055] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taa3BmQmlVdDZPbkE)
4. Voyaging in Hilbert Space, *Fortschr Phys.* **48,** 9-11, 769-770 (2000). [MIT-CTP-3117] [PDF](https://drive.google.com/file/d/1ngb090tOcI6P4QldtgdYZgXIOhrtnihr/view?usp=sharing)
5. Future Summary, *Int. J. Mod. Phys. A* **16,** N10 1653-1677 (2001). [MIT-CTP -3072]; hep- ph/0101187. [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUjBHcXdLamdPaEU)
6. Precision Precession, *Nature* **410,** 28-29 (2001). [MIT-CTP-3118] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUFBPaVJpNk44cEk)
7. When Words Fail, *Nature* ***410,***149 (2001) [MIT-CTP-3119] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taOUFremtuTzZ6VVk)
8. The Dirac Equation, in “It Must Be Beautiful: The Great Equations of Modern Science” ed. G. Farmelo (Granta Books, 2002) 102-130. Also in *Int. J. Mod. Phys.* A **19** S1 45-74 (2004). [MIT-CTP- 3120] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRWVUV1N6UC1VMWs)
9. Learning From QCD, Proceedings: EPIC 2000 workshop *AIP Conference* **588,** 13-33 [MIT-CTP- 3121] [PDF](https://drive.google.com/file/d/1yySAWais1dCVeoy7sE6nAdsUw079-0UP/view?usp=sharing)
10. Observability of Earth-Skimming Ultra-High Energy Neutrinos (with J. Feng, P. Fisher, and T. Yu) *Phys. Rev. Lett.* **88,** 161102 (2001). hep-ph/0105067 [MIT-CTP-3122] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMUxmQTJWSVBqMWM)
11. The Minimal CFL-Nuclear Interface (with M. Alford, K. Rajagopal, and S. Reddy), *Phys.Rev.*

*D* **64,** 074017 (2001) hep-ph/0105009 [MIT-CTP-3123] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tac0pqYUlWcGdETGM)

1. Unified Field Theories, in “The Encyclopedia of Physical Science and Technology Vol. 17 – Third Edition” ed. R. Meyers , 339-349 (Academic Press, 2001). [MIT-CTP-3124]
2. Scaling Mount Planck 1: A View from the Bottom, *Physics Today* **54N6,** 12-13 (2001). [MIT- CTP-3125] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQm9YY29DMGxsVXM)
3. Newton Rules (for now), *Nature* **410,** 881-882 (2001). [MIT-CTP-3126] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tadFhNSEdPNTJTMFk)
4. Quantum Chromodynamics, book in preparation for Princeton University Press. [abandoned]
5. Quark-Gluon Matter, in “McGraw-Hill Yearbook of Science & Technology” 298-299 (2002). [MIT- CTP- 3160]
6. Review of “ITEP Lectures on Particle Physics and Field Theory, Vols. 1 and 2” by M. Shifman, *Physics Today* **53N8,** 46-48 (2000). [MIT-CTP-3161] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNTIzOU8yaWQ2cWs)
7. What is Quantum Theory? *Physics Today* **53N6,** 11-12 (2000). [MIT-CTP-3159] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabGozc2U2eGJQR1k)
8. Quantum Statistics, in “Macmillan Encyclopedia of Physics, Supplement: Elementary Particle Physics” ( 2002). [MIT-CTP-3177]
9. The World’s Numerical Recipe, *Daedalus* **131,** 142-147 (2001). [MIT-CTP-3185] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSlRqdlo2MnJ0ejg)
10. Universality, *Nature* **415,** 265 (2001). [MIT-CTP-3186] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMl9kOFU4VjR3Tnc)
11. Scaling Mount Planck 2: Base Camp, *Physics Today* **54N11,** 12-13 (2001). [MIT-CTP 3187] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabjc4bTZpR1RlaGM)
12. Particle and Astroparticle Searche for Supersymmetry (with J. Feng and K. Matchev) SNOWMASS-2001-P309, (Nov. 2001). hep-ph/0111295 [MIT-CTP 3199] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNG9aYXdRaG5ISnc)
13. Reply to C. Alden Meade (Question of Fundamental Constants) *Physics Today,* **54N** 11-

15, (2001). [PDF](https://drive.google.com/file/d/1hl1sWjXJjV61rhOcmokPNhADtpWDdv0Q/view?usp=sharing)

1. Fermi and Elucidation of Matter, in “Fermi Remembered” ed. James W. Cronin, 34-51 (University of Chicago Press 2004). [MIT-CTP 3227] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taOW5YNVg4d0owSzg)
2. Obituary of William Edward Caswell (with C. Callan), *Physics Today* **54N12,** 74-75 (2001). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tab1FhQ2xpQVZuZDA)
3. Four Big Questions with Pretty Good Answers, delivered at Symposium in Honor of Heisen- berg’s 100th birthday, December 6, 2001. In “Fundamental Physics - Heisenberg and Beyond” ed. Gerd W.Buschhorn, Julius Wess (Springer 2004). hep-ph/0201222 [MIT-CTP-3236] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taY2JXLU05WTdHRlU)
4. The Social Benefit of High-Energy Physics, in *Macmillan Encyclopedia of Physics, Supplement: Elementary Particle Physics* (2002). [MIT-CTP-3237] PDF
5. Scaling Mount Planck 3: Is That All There Is? *Physics Today* **55N8**, 10-11 (2002). [MIT-CTP- 3276] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQ2t6cGlETXlpQTQ)
6. Depilating global charge from thermal black holes, John March-Russell, John et al. hep-th/0203170

CERN-TH-2001-378 [MIT-CTP-3236] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTVA2bjJ3NHA0UXM)

1. Some Basic Aspects of Fractional Quantum Numbers, Commentary for the Volume “Selected papers of J. Robert Schrieffer” ed. N.E. Bonesteel, L.P. Gor’kov (*World Scientific*) **135-152**(2002). cond-mat/0206122 [MIT-CTP -3275] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYXMxZFVZMF9NaGM)
2. Interior Gap Superfluidity (W. Vincent Liu), *Phys. Rev. Lett.* **90,** 047002 (2002). cond-mat/0208052 [MIT-CTP -3279] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tab0JxTFFLdnhLQU0)
3. QCD and Natural Philosophy, (Plenary talk at UNESCO TH2002 Conference) *Annales Henri Poincare* **4,** S211-S228, (2003). physics/0212025 [MIT-CTP-3328] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taM1prS0RIekFXTkU)
4. The Future of High Energy Physics, (Summary talk at ICHEP 2002 - Rochester Conference),

*Nucl. Phys* **B117,** (Proc Suppl.) 410-430 (2003). hep-ph/0212128 [MIT-CTP-3329] [PDF](https://drive.google.com/file/d/1ve2FIbO40RcyVUKtKpHxNTtMdNJAARwu/view?usp=sharing)

1. Opportunities Challenges and Fantasies in Lattice QCD, (Keynote talk at LATTICE 2002),

*Nucl. Phys* **B119,** (Proc. Suppl.) 3-12 (2003). hep-lat/0212041 [MIT-CTP-3337] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tack1Za25lM29nQ1k)

1. Life’s Parameters, *Physics Today,* **56N2,** 10-11 (2003). [MIT-CTP-3339] [PDF](https://drive.google.com/file/d/1_ZmIcvnrN1p07Q8IGWnUc5vCsCo_PlGN/view?usp=sharing)
2. Inaugural Editorial Letter, *Annals of Physics* **303** (2003). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaDNvREw5TVlYZEk)
3. Review of “Galileo’s Finger” by P. Atkins, *Nature* **422,** 377 (2003). [MIT-CTP-3358] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taLU5rN0JBV2daZVE)
4. Breached Pairing Superfludity: Possible Realization in QCD (with E. Gubankova and W. Vincent Liu) *Phys. Rev. Lett.* **91,** 32001 (2003). hep-ph/0304016[MIT-CTP-3357] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taYW5mejIwNE1tN0k)
5. Analysis and Synthesis I: What Matters for Matter, *Physics Today* **56N5,** 10-11 (2003), [MIT- CTP-3363] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taanpsRmo0dU9tdnM)
6. Analysis and Synthesis II: Universal Characteristics, *Physics Today* **56N,** 710-11 (2003). [MIT- CTP-3398] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeUZxYXhhcWY5Y1k)
7. Diquarks and Exotic Spectroscopy (with R.L. Jaffe), *Phys. Rev. Lett.* **91,** 232003 (2003). hep- ph/0307341 [MIT-CTP-3401] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taakltRXdvazFicEE)
8. The Origin of Mass, *Physics@MIT* **24-35** (2003). [MIT-CTP-3410] [PDF](https://drive.google.com/file/d/149aMU0PGHko6pUEMqahH1u84m6Zi7raK/view?usp=sharing)
9. Review of “Quantum: A Guide for the Perplexed” by J. Al-Khalili, *Nature* **424,** 997-8 (2003). [MIT- CTP-3412]
10. The World’s Numerical Recipe, in *The Best American Science Writing 2003,* ed. Oliver Sacks, 96-101 (Harper-Collins 2003). [PDF](https://drive.google.com/file/d/1U4l0G39nIQ5PLZrnbTUUNfwv05d-KuXr/view?usp=sharing)
11. Analysis and Synthesis III: Cosmic Groundwork, *Physics Today* **56N10,** 10-11 (2003). [MIT- CTP-3427] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTjdnbzZvQmMxck0)
12. Thermal Decay of the Cosmological Constant into Black Holes (with A. Gomberoff, M. Henneaux, C. Teitelboim), *Phys. Rev. D* **69,** 083520 (2004). hep-th/0311011 [MIT-CTP- 3433] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taU0Z0TnY1VzFWbVU)
13. Spin-Orbit Ordering, Momentum Space Coexistence, and Cuprate Superconductivity (with W. Vincent Liu) (2003). cond-mat/0312685 [MIT-CTP-3436] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taN25TY0N0MF8yMTQ)
14. Spin dependent Hubbard Model and a Quantam Phase Transition in Cold Atoms (with W. Vincent Liu and Peter Zoller), *Phys. Rev. A* **70,** 033603 (2004). cond-mat/0404478 [MIT- CTP-3437] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSmU0b0RucFpESnM)
15. Systematics of Exotic Cascade Decays (with R.L. Jaffe) *Phys. Rev.*

*D* **69,** 114017 (2004). hep-ph/0312369, [MIT-CTP-3463] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUEFjRXR5M2Q3REE)

1. From Concept to Reality to Vision, (speech accepting EPS high energy physics prize), *Eur. Phys. J.* **C33,** S1-S4 (2004). hep-ph/0401035 [MIT-CTP-3460] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taalljOHFMWDR2b2M)
2. A Perspective on Pentaquarks (with R.L. Jaffe) (plenary talk at EPS conference), *Eur.Phys. J.***C33,** S38-S42 (2004). hep-ph/0401034 [MIT-CTP-3461] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQk9VdDl4dlNGNTA)
3. Analysis and Synthesis IV: Limits and Supplements, *Physics Today* **57N1,** 10-11 (2004). [MIT- CTP-3464] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taT3JadENuOF82WG8)
4. The Universe is a Strange Place, (keynote talk at SpacePart 03: 2nd International Conference on Particle and Fundamental Physics in Space, Washington, DC) *Nuclear Physics B Proceedings Supplements* **134,** 3-12 (2004). astro-ph/0401347 [MIT-CTP-3465] (Note: differsfrom 390.) [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taUHRRSXRNYWNYeHM)
5. A constructive critique of the three standard systems, in Advanced Studies Institute: Physics at

LHC-Praha-2003, Prague, CR), *Czech. J. Phys.* **54,** A415-A427 (2004). hep-ph/0401126 [MIT- CTP- 3466] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSlVMWXFNV3U3cVU)

1. From ‘not wrong’ to (maybe) right, *Nature* **428,** 261 (2004). physics/0403115 [MIT-CTP-3480] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taX3JOSzczMmdZeUE)
2. Total Relativity: Mach 2004, *Physics Today* **57N4,** 10-11 (2004). [MIT-CTP 3482] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWV90dzd1M1FwZ1E)
3. Stability Criteria for Breached Pair Superfluidity (with Michael McNeil Forbes, Eleana Gubankova and W. Vincent Liu) *Phys. Rev. Lett.* **94,** 017001 (2004). hep-ph/0405059 [MIT- CTP-3491] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tad2ZXbi1DZE4zRVk)
4. Quarks, Diquarks and Pentaquarks (with R.L. Jaffe), *Physics World,* **17,** 25-30 (2004). [MIT- CTP-3492] [PDF](https://drive.google.com/file/d/169CyqKXWYhMDN1HqNpIeSMunnpOFAShL/view?usp=sharing)
5. Answers to “What is the physicist’s concept of symmetry?”, “Could we tell if left and right where reversed?” in Access Science @ Mc Graw-Hill, [www.accessscience.com](http://www.accessscience.com/)
6. Yang-Mills Theory In, Beyond, and Behind Observed Reality, in “50 years of Yang-Mills Theory” ed. G. ’t Hooft 255-69 (*World Scientific,* Singapore) (2004). hep-ph/0405147 [MIT-CTP 3493] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSW9wMmM3N21NcHM)
7. A Model of Anthropic Reasoning, Addressing the Dark to Ordinary Matter Coincidence, So- licited article for “Universe or Multiverse” ed. B. Carr (Cambridge University Press) (2004). hep-ph/0408167 [MIT-CTP- 3526] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taR2lTWmNxOWVGbDA)
8. Whence the Force of F=ma? 1: Culture Shock, *Physics Today* **57N10,** 11-12 (2004) [MIT- CTP-3527] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabkxDU0djSk1HalU)
9. Diquarks as Inspiration and as Objects, in “Kogan Memorial: From Fields to Strings” Vol. 1, ed. M. Shifman, 77-93 (World Scientific) (2004). Also in “Deserfest: A Celebration of the Life and Works of Stanley Deser” ed. J. Liu, M. Duff, K. Steele, R. Woodard, 322 *(World Scientific) (2004).* hep-ph/0409168 [MIT-CTP-3529] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSXFaTlZyWDBvYjg)
10. Breached Superfluidity in p-wave (with E. Goubankova and E. Mishchenko), *Phys. Review Lett.***94,** 110402 (2005). cond-mat/0409088 [MIT-CTP-3528] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaTdvY3NrTEhVU2M)
11. Doing science gave me freedom, in “One Hundred Reasons To Be a Scientist”, 250-51 (40th anniversary issue, Abdus Salam international centre for theoretical physics) (2004). [MIT-CTP- 3530] [PDF](https://drive.google.com/file/d/1LUhltx3rriuNtpoGCFzJNKcGp60x_mKQ/view?usp=sharing)
12. In Search of Symmetry Lost *Nature* **433,** 239-247 (2004). [MIT-CTP-3531] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taX3hJRnpqMTZYN2M)
13. Hadron Systematics, Diquark Correlations, and Exotics (with A. Selem) (2004). [MIT-CTP- 3532] [superseded by 403.]
14. Reply to letters commenting on Reference Frame article Analysis and Synthesis IV: Limits and Supplements, *Physics Today* **57N9,** 14-15 (2004). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taMTFORlBzc2ZsaUE)
15. Whence the Force of F=ma? II: Rationalizations, *Physics Today* **57N12,** 10-11 (2004). [MIT- CTP-3563] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNjQyRUthc0RmNzA)
16. Gapless Surfaces in Anisotropic Superfluids (with E Gubankova and E Mishchenko), *Phys.*

*Rev. B***74,** 184516 (2006). cond-mat/0411238 [MIT-CTP-3562] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWGdpUkZrWjFCd1E)

1. Whence the Force of F=ma? III: Cultural Diversity, *Physics Today* **58N7,** 10-11 (2004). [MIT-CTP- 3590] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taaC1JNVNSckhtZjQ)
2. A Relationship Between Hawking Radiation and Gravitational Anomalies (with S. Robinson), *Phys. Review Lett.* **95,** 011303-1 (2005). gr-qc/0503074 [MIT-CTP-3561] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeGdVUnBVbVpKUTA)
3. Asymptotic Freedom: From Paradox to Paradigm, (Lecture on Receipt of Nobel Prize) *Les Prix Nobel* **100-124**(Almqvist & Wiesell International, Stockholm, Sweden) (2004). hep-ph0502113 [MIT-CTP-3605] a. Photograph *Le Prix Nobel* 96 (2004). *b. Biography Le Prix Nobel* 97-99 (2004).[PDF](https://drive.google.com/open?id=0B7pl5V0YU9tabU4xZW5tYndwQk0)
4. Shelf Life (Interview) *Physics World* **1747** (Nov. 2004). [PDF](https://drive.google.com/file/d/1Ltv3ZXTkhLEUJO3g1ktGxaEIFx5fzuU1/view?usp=sharing)
5. Treks of Imagination (Review of “The Road to Reality” by Roger Penrose) *Science* **307,**

(2004). [PDF](https://drive.google.com/file/d/1kGM1po08GAWYJMcyx5E_UAuR8ggX6-0C/view?usp=sharing)

1. New Physical Laws Suggested by Symmetry (Lecture on receipt of King Faisal International Prize), *Articles In Medicine and Science V,* **83** (2004-2005).
2. Gravitational Correction to Running of Gauge Couplings (with S. Robinson) *Phys. Rev. Lett.*

**96,** 213601 (2006). hep-th/0509050 [MIT-CTP 3617] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTzIxQVJha0RDZlE)

1. The Origin of Mass World Year of Physics Essay, Frontline Vol. 22 (2005); also *Mod. Phys Lett. A* **21** 701-12 (2006). (Modified from 342.) [MIT-CTP 3642]
2. An emptier emptiness? *Nature* **435,** 152 (2005). [MIT-CTP 3643] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taSWVFZFpJanl2MDg)
3. Happy 100th Birthday, Special Relativity, (<http://www.accessscience.com>) (2005). [MIT-CTP- 3656]
4. My Favorite Scientific Picture, *Science et Vie, (Science and Life)* (June 05) Exploration, 6, [MIT-CTP -3657]
5. Reductionism is Dead, Long Live Reductionism, (<http://www.pagewise.com>) (2005). [MIT-CTP 3658]
6. Asymptotic Freedom: From Paradox to Paradigm, *Rev. Modern Physics* **77,** 857 (2005); PNAS 102 N24 8403-13 (2005); Int. J. Mod. Phys. A 20 (2005). (See item 373.) [MIT-CTP-3659]
7. Advantages and Distinguishing Features of Focus Point Supersymmetry (with Jonathan L. Feng) *Phys. Lett.* **B631,** 170-176 ) (2005). hep-ph/05007032, [MIT-CTP- 3629] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taNEJhS0VmMU1HdVE)
8. General Issues Connecting Flavor Symmetry and Supersymmetry (with E. Bilgin, B. Patt, D. Tucker-Smith) *Phys. Lett.* **B634,** 69-73 (2006). hep-ph/0509075, [MIT-CTP- 3682] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZ21BeHhmTFZUd2c)
9. Example of a Hidden Flavor Sector (with B. Patt and D. Tucker-Smith) (2005). hep-ph/0509295 [MIT-CTP-3687] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZzhteEoyMDZnLW8)
10. Journal Club: Promise that anyon particles hold for quantum computing excites the physicist who named them *Nature* **437,** 299 (2005). [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTWFuMC03cC16X1k)
11. On Absolute Units, I: Choices, *Physics Today* **58N10,** 12-13 (2005). [MIT-CTP-3690] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWUM5dFBwNWR6M3c)
12. An explorer and surveyor *Nature* **437,** 1095 (2005). (tribute to H. Weyl) [MIT-CTP 3694] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQW00NmliSHpBdGc)
13. The Universe is a Strange Place, *Lepton-Photon Interactions at High Energies, International Symposium XXII Proceedings* 447-61; also in *Int. J. Mod. Phys.* **A 21,** 8-9 (2005). physics/0511067 (2005) [MIT-CTP-3701] (Different from 353.)
14. Enlightenment, Knowledge, Ignorance, Temptation, in *Universe or Multiverse*? ed. Bernard Carr (Cambridge University Press) (2005). (Summary talk given at Conference “Expectations of a Final Theory”, Cambridge University.) hep-ph/0512187 [MIT-CTP-3709] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taeUc3bHdmampFMEk)
15. Dimensionless constants, cosmology and other dark matters (with M. Tegmark, A. Aguirre, and M. Rees ) , *Phys. Rev. D****.* 73,** 023505 (2006). astro-ph/0511774 [MIT-CTP-3710] [PDF](https://drive.google.com/file/d/1yK93HUKerHOZxCZ4D3gZHqLUgdr3ProN/view?usp=sharing)
16. On Absolute Units, II: Challenges and Responses, *Physics Today* **59N1,** 10-11 (2006). [MIT- CTP-3711] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taQl9uVkZvSU8tY0E)
17. From Electronics to Anyonics, *Physics World* **19,** 22 (2006). [MIT-CTP-3713] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taTWpMTmZHUEhFcFU)
18. Hawking radiation of charged blackhole through gauge and gravitational anomalies (with Satoshi Iso, Hiroshi Umetsu) *Phys. Rev. Lett.* **96,** 151302 (2006). hep-th/0602146 [MIT- CTP-3714] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVHJEWFNNX2l3MjA)
19. *Fantastic Realities: 49 Mind Journeys and a trip to Stockholm* (*World Scientific,* Singapore) (2006).
20. Hadron systematics and emergent diquarks (with A. Selem) *in Ringberg 2005, New trends in*

*HERA physics,* eds. Grindhammer, Kniehl, Kramer and Ochs, *World Scientific*. ISBN

#9789812773524, pp. 337-356 (2006). hep-ph/0602128 [MIT-CTP 3721] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taZURVOVlIeFFUbEU)

1. Stability conditions and fermi surface topologies in a superconductor (with E. Gubankova and A. Schmitt) *Phys. Rev.* **B74,** N6 (2006). cond-mat/0603603 [MIT-CTP 3722] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVGJySUZqMGFXbzg)
2. Anomalies, Hawking radiation and regularity in rotating black holes (with S Iso, H. Umetsu) Phys. Rev. D 74, 044017 (2006). hep-th/0606018 [MIT-CTP 3730] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taWnA3ZGZBQ19jYTg)
3. On Absolute Units, III: Absolutely Not, Physics Today 59N5, 10-11 (2006). [MIT-CTP-3742] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taVGdCXzNLWFFQV00)
4. Higgs-field Portal into Hidden Sectors, (with Brian Patt) hep-ph/0605188 (2006). [MIT-CTP 3745] [PDF](https://drive.google.com/open?id=0B7pl5V0YU9taRHVpWXZ6dmswNE0)
5. My Favorites [Discussion of favorite books], New York Academy of Sciences Update 19, (May/June 2006) [PDF](http://frankwilczek.com/selectedPubs20080610.pdf)
6. Hadron Systematics Exposing Diquark Correlation (with A Selem) (2006). [MIT-CTP 3762]
7. On Magic Moments, SEED (November, 2006). [MIT-CTP 3766]
8. Archaeopteryx Looks Up. Speculations on the Future of Human Evolution, New York Academy of

Sciences Update 20, pp. 10-13 (Sept/Oct 2006) [MIT-CTP 3767] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taMnRrcW1jR0NBWG8/view?usp=sharing)

1. Reasonably Effective 1: Deconstructing a Miracle, Physics Today 59N11, 8-9 (2006). [MIT-CTP 3768] [PDF](https://drive.google.com/file/d/1hSjeEvfRAS9DW815W-hr5Bha-sTy4zj1/view?usp=sharing)
2. Did the Big Bang Boil? Nature 443, 637 (2006). [MIT-CTP 3769] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taaHdNQ0dDM2xSa0k/view?usp=sharing)
3. Resonating with Feshbach, Physics @MIT 32-35 (2006) [MIT-CTP 3770] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tabkhqWXdmeU1oZ28/view?usp=sharing)
4. Pappalardo Sonnet, Physics @MIT 25 (2006).
5. Quantum Chromodynamics, SciDAC Review (Fall 2006). [MIT-CTP 3776]
6. The Big Questions, *New Scientist,* 50th Anniversary Special 99 (November, 2006)
7. Hard-core revelations, *Nature* **445,** 156 (2007). [MIT-CTP 3804] [PDF](https://drive.google.com/file/d/1ObQB5hUuV_J_Te8jWDslLL4d1WOFxLXK/view?usp=sharing)
8. La musica del vuoto (Music of Void), *Di Renzo Editore* (2007)
9. Reasonably Effective II: Devil’s Advocate, *Physics Today* **60,** N5 8-9 (2007). [MIT-CTP 3826] [PDF](https://drive.google.com/file/d/1YbeNl9oYGGJXgpzRaYiACv3jzW9wPXsA/view?usp=sharing)
10. W Poszukiwaniu Harmonii *Longing for the Harmonies*, translators Lokas and Bieniok

*Pr´oszyn´ski i S-kq (2007)*

1. Fundamental Constants, in “Visions of Discovery, in honor of Charles Townes’ 90th Birthday” ed. R. Chiao, Part II 75-104 (2007). physics.gen-ph/0708.4361 [MIT-CTP 3847]
2. Quantum Chromodynamics: Lifestyles of the small and simple, Nature Physics 3, 375-6 (June, 2007). [MIT-CTP 3848] [PDF](https://drive.google.com/file/d/14E7K0xTmvCL7tsKMUbzHLAGWtCg61une/view?usp=sharing)
3. Physics Will Not Achieve a Theory of Everything, in “What are you Optimistic About?” ed. John Brockman (Harper Perennial 2007)
4. Anticipating a New Golden Age (Invited Lecture at SUSY 07, Karlsrube) in “SUSY 07 Proceedings: Perspectives on LHC Physics” ed. G. Kane and A. Pierce (World Scientific, July 2008); also in *Int. J. Mod. Phys.* **A23.** 1791-1811 (2007); also in *European Physical Journal C* **59 85** (2007). hep-ph/07084236 [MIT-CTP 3858] [PDF](https://drive.google.com/file/d/1ldKCBuMXfPfkfq92lrmZZdaywCKt4J_6/view?usp=sharing)
5. Big Troubles, Imagined and Real, in “Global Catastrophic Risks”, ed. N. Bostrom and M. Cirkovic (Oxford University Press) 346 (July, 2008). [MIT-CTP 3863]
6. Near-Zero Modes in Superconducting Graphene, (with Pouyan Ghaemi) cond.- mat:supr-con/0709.2626; v2 (September 2011) *Phys. Scr.* **T146,** 014019 (2012) [MIT- CTP 3864]
7. My Wizard, *Physics Today* **61,** N1 (2008). [MIT-CTP 3866][PDF](https://drive.google.com/file/d/1GfxOHlc3OmU5gYxJ85Riw3C1I_S79ee8/view?usp=sharing)
8. *The Lightness of Being: Mass, Ether and the Unification of Forces* (Basic/Perseus) (August 2008)
9. Axion Cosmology and the Energy Scale of Inflation (with Mark Hertzberg and Max Tegmark)

*Phys. Rev. D.* **78,** 083507 (2008). astro-ph/0807.1726 [MIT-CTP3950] [PDF](https://drive.google.com/file/d/1AE4GalMFAHPARwvcLGkmeclLD1IcMgez/view?usp=sharing)

1. QCD Meets BCS Meets QQ¯ , in “QCD Down Under 2”, p. 7. [PDF](https://drive.google.com/file/d/1TEVbml7z2X8-M7OotumGGq7j1ECGRTP1/view?usp=sharing)

 [MIT-CTP 3945]

1. Forecasting the Fate of Mysteries: Our modern answer to the Pyramids, Newsweek (September 2008)
2. The Beginning of a New Golden Age in Understanding the Laws of Nature Po drogach uc- zonych (Polska Akademia Umiejetnosci, Krakow 2008) 763.
3. New Kinds of Quantum Statistics, in “Spin - Poincar`e Seminar 2007” 61-69, ed. B. Duplantier,

J.M. Raimond, and V. Rivasseau, (Birkhauser Verlag AG, 2009). hep-ph 0812.5097 [MIT-CTP 3997].

1. Mass by Numbers Nature 456, 449 (2008). [MIT-CTP 4002] [PDF](https://drive.google.com/file/d/1fekPr7zjUXfITa-NcNrG0zbRzMchXMnr/view?usp=sharing)
2. Introduction to “Philosophy of Mathematics and Natural Science”, by Hermann Weyl (Princeton University Press, 2008). [MIT-CTP 4005]
3. Running Inflation in the Standard Model (with Andrea De Simone, Mark P. Hertzberg),

Phys. Lett. B 678, 1-8 (2009). hep-ph/0812.4946 [MIT-CTP 4008] [PDF](https://drive.google.com/file/d/1kU1M2Ir4KmmVqm_lVImd0CdHJ9HLH-b0/view?usp=sharing)

1. “National Greatness” Versus Real National Greatness, Science News (October 2008).
2. A Slice of Scifoo, Edge, The Third Culture (2008).

(<https://bit.ly/2FLAPMm>).

1. Majorana Returns, *Nature Physics* **5,** 614-618 (2009). [MIT-CTP 4016] [PDF](https://drive.google.com/file/d/1HfcrK9tCqbK0JWIIUlAGnFu8VmptCFVI/view?usp=sharing)
2. Journal Club: A theoretical physicist examines exotic particles lurking in new materials, *Nature*

**458,** 129 (2009). [MIT-CTP 4017] [PDF](https://drive.google.com/file/d/17YHjgdMadBBGG2-MWumdOJ96g6txkeEC/view?usp=sharing)

1. What is Space?, *Physics @MIT 30* (2009). [PDF](https://drive.google.com/file/d/1-kV6ZgIcIuFgfHGX1a4fKE79JMrsre8T/view?usp=sharing)
2. Quantum Field Theory, in “Compendium of Quantum Physics” eds. D. Greenberger, K. Hentschel,

F. Weinert (Springer, 2009).

1. The Social Benefit of High-Energy Physics: Challenges, Transformations and Development,

in “Transformations - Risk, Crisis, Adaptation” ed. V. I. Ionesov 102-122 (Samara, 2009).

1. Prelude to Compressed Baryonic Matter, The CBM Physics Book eds. B. Friman, C H¨ohne,

J. Knoll, S Leupold, J. Randrup, R. Rapp, and P. Senger Lecture Notes in *Physics* **814,** 1-10 (Springer, 2011). hep-ph 1001.2729 [MIT-CTP 4109] [PDF](https://drive.google.com/file/d/1WZZuAPft4jCsiVsAsUwE8SpGA2TdrgJd/view?usp=sharing)

1. Some Calculable Contributions to Entanglement Entropy, (with Mark P. Hertzberg) hep-th1007.0993 *Phys. Rev. Lett.* **106,** 050404 (2011). [MIT-CTP 4110] [PDF](https://drive.google.com/file/d/1VHXR1aGP3OeNyH3e_cQ1-WKKFMvpNY9z/view?usp=sharing)
2. Beyond the Standard Litany: LOSP, Higgs Portal, Lattice Lattice Gauge Theory, *European*

*Physical Society Europhysics Conference on High Energy Physics,* *PoS EPS HEP2009:001*

(2009). hep-ph/1003.4672v2 [MIT-CTP 4133] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taTzFIX0x6UUw2Slk/view?usp=sharing)

1. The Mind’s New Eye, Project *News Syndicate* (March 2010). [PDF](https://drive.google.com/file/d/1bMpC3rzp33rVy9pQnWK2wad4f1af7StR/view?usp=sharing)
2. Effective Action, Boundary Conditions and Virasoro Algebra for AdS (with Achilleas P. Porfyriadis) (July 2010). gr-gc 1007.1031 [MIT-CTP 4160] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tab1A1NEpRcEdkQms/view?usp=sharing)
3. BCS as Foundation and Inspiration: The Transmutation of Symmetry, *Mod. Phys. Lett. A* Vol. **25,** No. 3, 3169-3189 (2010); also in “BCS: 50 Years”, ed. L. Cooper and D. Feldman (World Scientific) pp. 535-558 (2010). cond-mat.supr.con 1008.1741 [MIT-CTP4173] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tabmlycUtqVXV1X0E/view?usp=sharing)
4. A Landmark proof (Viewpoint on “Plasma analogy and non-Abelian statistics for Ising-type

quantum Hall states”), *Physics* **V4,** 10 (2011). [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taakxkMXREcTNxbkk/view?usp=sharing)

1. Introduction to “Quantum Matter” *Phys. Scr.* **T146,** 014001(2012). cond-mat.med-hall 1109.1523

[MIT-CTP 4292] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taUnl3b1hTSzBPUFU/view?usp=sharing)

1. *Quantum Beauty:* *Real and Ideal*, in “Beauty” ed. L. Arrington, Z. Leinhardt and P. Dawid, (Cambridge University Press) pp. 43-71 (2013). [MIT-CTP 4294] [PDF](https://drive.google.com/file/d/1STwBbipmV4HTsDAFo8-PGgLQKZ6BBF8a/view?usp=sharing)
2. MIT 150 Infinite History Interview (October 2011). [MIT-CTP 4313]

(<https://bit.ly/2Ia98jv>).

1. Classical Time Crystals (with A. Shapere), *Phys. Rev. Lett.* **109,** 160402 (2012). cond-mat.other 1202.2537 [MIT-CTP 4347] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taQWxLWkFkS2lzOEU/view?usp=sharing)
2. Quantum Time Crystals, *Phys Rev. Lett.* **109,** 160401 (2012) quant-ph 1202.2539 [MIT-CTP 4348] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taRG14NnlfeFRHeWc/view?usp=sharing)
3. Hidden Layers, in “This Will Make You Smarter”, ed. John Brockman, (*Harper Perennial,* 2012*).*
4. Newton method for stationary states (with Xaoxi Zhang) [MIT-CTP 4352] (abandoned)
5. Introductory Remarks, in “Nobel Symposium 148: Graphene and Quantum Matter”, eds. A.

Niemi, F. Wilczek, E. Ardonne, H. Hansson, *Physica Scripta,* **2012**, T146 (2012). [PDF](https://drive.google.com/file/d/19wYf2QpkQTy9OKZX1Y53HG7jn_nRhcBj/view?usp=sharing)

1. Happy Birthday Electron, *Scientific American* (June 2012). [PDF](https://drive.google.com/file/d/1TBfr1DxEJjeGiWVJsjyZLbKvxdQm_19T/view?usp=sharing)
2. A Long View of Particle Physics, in “The Theory of the Quantum World (Solvay Conference Proceedings” ed. D. Gross, M. Henneaux and A. Sevrin *(World Scientific,* 2013). hep-th 1204.4683, [MIT-CTP 4358] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tadEw2cE5vVjFHS3c/view?usp=sharing)
3. Final Editorial Letter, *Annals of Physics* 327/6, **327,** 7, 1785-1932 (2012).
4. Branched Quantization (with A. Shapere), *Phys. Rev. Lett.***109,** 200402 (2012). quant-

ph/1207.2677 [MIT-CTP 4381] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tacU4yR0QybHV0NVE/view?usp=sharing)

1. Quantum physics: Majorana modes materialize, *Nature* **486,** 195-197 (June 2012). [MIT-CTP 4376] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taYm1fTzRiV0ZKb3c/view?usp=sharing)
2. Origins of Mass, *Central European Journal of Physics* **D12,**00144 (June 2012) hep-ph 1206.7114 [MIT-CTP 4379] [PDF](https://drive.google.com/file/d/1h-7QCNnFe6rGTvsyfBhYp_62wWgqlZb4/view?usp=sharing)
3. Foreward to “Radioactive Transformations” by Ernest Rutherford, pp. ix-xli (Yale University Press) (2012). [PDF](https://drive.google.com/file/d/1tI-zUR_VZdhx6e5womZwar3LYrE2Nqzd/view?usp=sharing)
4. Constraints on Chronologies (with Alfred Shapere), gr-qc 1208.3841 [MIT-CTP 4389] (Aug. 2012). [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tacEt0SkMzcThtams/view?usp=sharing)
5. Models of Topology Change (with Alfred Shapere and Zhaoxi Xiong), hep-th 1210.3545, [ MIT-CTP 4397] (October 2012) [PDF](https://drive.google.com/file/d/1jFVj3bGlamgtgx9m2-wkKar5ergt4TEx/view?usp=sharing)
6. "A watershed: the emergence of QCD" (with David Gross), *CERN Courier*(2013). [MIT-CTP 4435] [PDF](https://drive.google.com/file/d/1KjLS2CSDzPdJSXbf-Pxhp3mm3UNOJ0BT/view?usp=sharing)
7. The Modern Concept of Substance, Bulletin of the *American Academy of Arts and Sciences.*

Bulletin Vol. LXVI/No. 2, 29-34 (Winter 2013). [MIT-CTP 4433] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taUWQ4OFY3ZDVJdFE/view?usp=sharing)

1. What’s Next: Follow Beauty (Viewpoint), *New Scientist* **46** (March 2013). [PDF](https://drive.google.com/file/d/1yLIimCecF_G17ZmtxcyQrqDFGkI8mrDJ/view?usp=sharing)
2. Reply to Bruno’s Comment, *Phys. Rev. Lett.* **110,** 118902 (2013). [PDF](https://drive.google.com/file/d/1zgDU3LTU2kFKZ-ikl3PC_0Q8KSGKexlq/view?usp=sharing)
3. Particle Physics: Minimalism triumphant *Nature* **496,** 439-441 (April 2013). [MIT-CTP 4458] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tabTc5aXhfa2x1VFU/view?usp=sharing)
4. Why Does the Higgs Particle Matter? *Big Questions Online* (April 2013). [PDF](https://drive.google.com/file/d/1DSe0dEKlSbi9jrSYgZojUbsSRbKsgqHg/view?usp=sharing). [bigquestionsonline.com/content/why-does-higgs-particle-matter.](http://www.bigquestionsonline.com/content/why-does-higgs-particle-matter)
5. The enigmatic electron *Nature* **498,** 31 (2013). [MIT-CTP 4466] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taaFpCM01BeU55Ymc/view?usp=sharing)
6. Ken Wilson: A Scientific Appreciation, *Proceedings of the National Academy of*

*Sciences of the United States of America,* **110,** 32, 12855–12856, doi: 10.1073/pnas.1312463110

(2013). [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taSkV6NElCN2FNQzA/view?usp=sharing)

1. Review of “The God Problem: How a Godless Cosmos Creates” by Howard Bloom, *Physics Today* **66,** N7 (July 2013). [PDF](https://drive.google.com/file/d/1M8TOeU794hpE5TGcOeY3budTubfuGjQ5/view?usp=sharing)
2. Algebra of Majorana Doubling (with Jaehoon Lee), *Phys. Rev. Lett.* **111,** 226402 (2013).

arXiv:1307.3245 [cond-mat.supr-con] [MIT-CTP 4481] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taVFg2Yjhpc2ctcE0/view?usp=sharing)

1. Multiversality, *Class.Quant. Grav.* **30,** 19 (July 2013). hep-th/1307.7376 [MIT-CTP

4484] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taNDdnTF9qT3VSTEE/view?usp=sharing)

1. Superfluidity and Space-Time Translation Symmetry Breaking *Phys. Rev. Lett.* **111,** 250402 (2013). cond-mat.supr.con 1308.5949 [MIT-CTP 4486] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taOF9PSUlXWUxDZ28/view?usp=sharing)
2. Using Cosmology to Establish the Quantization of Gravity (with Lawrence Krauss) *Phys. Rev. D.* **89,** 047501 (2014), hep-th 1309.5343 [MIT-CTP-4497] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taOHNsVjhEMGpnOGs/view?usp=sharing)
3. Emergent Majorana Mass and Axion Couplings in Superfluids, *New Journal of Physics.* **16** (2014).

hep-ph/1401.4379 [MIT-CTP4529] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taQjY5bHFfN3RTYVE/view?usp=sharing)

1. Majorana and Condensed Matter Physics, Chapter 14 in “The Physics of Ettore Majorana” (Cambridge University Press) (2014). cond-mat.supr-con 1404.0637 [MIT- CTP 4542] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tadlZRSENvb01NMzg/view?usp=sharing)
2. From B-Modes to Quantum Gravity and Unification of Forces (with Lawrence Krauss), gr-qc

1404.0634, April (2014). Awarded First place in 2014 by Gravity Research Foundation Awards for

Essays on Gravitation, *Int. J. Mod. Phys. D***23,** 1441001 (2014). [MIT-CTP 4543] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taSEViTlY3b29sdEE/view?usp=sharing)

1. Inflation Driven by Unification Energy, (with Mark Hertzberg), *Phys. Rev. D.* **95,** 063516

(2017). hep-th/1407.6010 [MIT-CTP 4551] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taMEtIT0VLX1ladlE/view?usp=sharing)

1. Entanglement Enhanced Intensity Interferometry (with Jordan Cotler) (February 2015). quant-ph 1502.02477 [MIT-CTP 4641] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taWEZfendZSGVwVGc/view?usp=sharing)
2. Entangled Histories (with Jordan Cotler), quant-ph 1502.02480, (February 2015), MIT-CTP 4642.[PDF](https://drive.google.com/file/d/0B7pl5V0YU9taT3ctS3ltRXZVd0k/view?usp=sharing)
3. Bell Tests for Histories (with Jordan Cotler), quant-ph 1503.06458v1 (March 2015). [MIT-CTP 4653] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taUHBnbmtqUFBHb2M/view?usp=sharing)
4. Physics in 100 Years (2015). arXiv:1503.07735 [physics.pop-ph] [MIT-CTP 4654],

(<https://bit.ly/2FLtIne>) [PDF](https://drive.google.com/file/d/1GjwDmlR_-LICMKz1dkRk6dgRMqxWbAnw/view?usp=sharing)

1. Particle physics: A weighty mass difference, *Nature* **520,** 303 (2015). [MIT-CTP 4679] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taTkRGdG1rckY4RGs/view?usp=sharing)
2. Unification of Force and Substance, Phil. Trans. R. Soc. A 374, 20150257 (2016) <https://doi.org/10.1098/rsta.2015.0257>. [MIT-CTP 4744] [PDF](https://drive.google.com/file/d/1qqBFE6ac66xpJh8Isjaraek_hpFhH-VM/view?usp=sharing)
3. Oscillatory Attractors: A New Cosmological Phase (with Jasdeep Bains and Mark Hertzberg),

*JCAP* **05,** 011 (2017). hep-th 1512.02304 [MIT-CTP 4745] [PDF](https://drive.google.com/file/d/1ev45f21bhz59MZLTYIDepZb9K3BdLrpD/view?usp=sharing)

1. Superheavy Light Quarks and the Strong P, T Problem (with Guy D. Moore) hep-ph 1601.02937 (January 2106). [MIT-CTP 4759] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taa1FNR3o5akxhSW8/view?usp=sharing)
2. Experimental test of entangled histories, (with J. Cotler, L-M Duan, P-Y Hou, D. Xu, Z-Q Yin and Chong Zu) (January 2106). quant-ph 1601.02943 [MIT-CTP 4749] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taS0ZBenVXcUVockU/view?usp=sharing)
3. Superfluidity and Symmetry Breaking: An Anderson Living Legacy, in “A Lifetime of Emergence”

(P. W. Anderson 90th birthday) ed. P. Chandra, P. Coleman, *World Scientific,* pp. 187-213,
arXiv:1605.06993 (2016). [MIT-CTP 4781]

1. Physics in 100 Years, *Physics Today***69,** 4, 32 (2016). doi: 10.1063/PT.3.3137. [PDF](https://drive.google.com/file/d/1AHHKbXAeyw0tH3N-A832IyO5Ctf2_njS/view?usp=sharing)
2. Particle Physics and Condensed Matter: The Saga Continues, The Royal Swedish Academy of

Sciences, *Physica Scripta,* 2016, T168. arXiv:1604.05669 [MIT-CTP 4787] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taTVhfMW1jQnFsTXc/view?usp=sharing)

1. Entanglement Enabled Intensity Interferometry of Different Wavelengths of Light (with Jordan Cotler), (July 2016). quant-ph 1607.05719 [MIT-CTP-4814] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taeXFyMlRFeWFuaDQ/view?usp=sharing)
2. Statistics of fractionalized excitations through threshold spectroscopy, (with Siddhardh C. Morampudi), *Phys. Rev. Lett*. 227201 (2017). cond-mat.str-el 1608.05700 [MIT-CTP/4822] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taUmk1MVVZZks3Q1U/view?usp=sharing)
3. Theory Vision LHCP 2016, *PoS LHCP2016 047* (2016). arXiv:1609.06941 [hep-ph]

[MIT-CTP 4836] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taTW5tWGI3WHJ1R3M/view?usp=sharing)

1. Temporal Observables and Entangled Histories(with Jordan S. Cotler), quant-ph 1702.05838v1, (February 2017), MIT-CTP-3881. [PDF](https://drive.google.com/file/d/0B7pl5V0YU9taVWt3c2VTZmpYcE0/view?usp=sharing)
2. *A Beautiful Question: Finding Nature’s Deep Design* (Penguin) (2015).
3. A Model of Comprehensive Unification (with [Mario Reig](https://arxiv.org/find/hep-ph/1/au%3A%2BReig_M/0/1/0/all/0/1), [José W.F. Valle](https://arxiv.org/find/hep-ph/1/au%3A%2BValle_J/0/1/0/all/0/1), [C.A. Vaquera-Araujo](https://arxiv.org/find/hep-ph/1/au%3A%2BVaquera_Araujo_C/0/1/0/all/0/1)),

(June 2017), Report number:IFIC/17-XXX arXiv:1706.03116 [MIT-CTP-4913] [PDF](https://drive.google.com/file/d/0B7pl5V0YU9tacktQZFZHa1JmMU0/view?usp=sharing)

1. *What is the Value of Imagination and Wishful Thinking in Science?* (July 2017)

 [PDF](https://drive.google.com/file/d/1-A9nZOefVHw7qSGD7iOLpnQairj1hUzO/view?usp=sharing)

1. Dilute and dense axion stars (with Luca Visinelli, Sebastian Baum, Javier Redondo, Katherine Freese), *Phys. Lett. B. Vol.* 777 (Feb 2018), p. 64-72.(<https://doi.org/10.1016/j.physletb.2017.12.010>). [PDF](https://drive.google.com/file/d/122gcdivbBzZeimS6z77THQluETtDRQte/view?usp=sharing)
2. Experimental test of entangled histories (with Jordan Cotler, Lu-Ming Duan, Pan-Yu Hou, Da Xu, Zhang-Qi Yin, Chong Zu), *ScienceDirect,* **387** (Dec 2017), p. 334-347. MIT-CTP-4749 (<https://doi.org/10.1016/j.aop.2017.09.004>) [PDF](https://drive.google.com/file/d/1JToiVfdHnAGwn7sIrdcyHWUpPfIIsKrn/view?usp=sharing)
3. Ludwig Faddeev Memorial Volume: A Life In Mathematical Physics. *Ludwig Faddeev Memorial Volume: A Life in Mathematical Physics*. World Scientific.
4. 22 mind-blowing science facts we didn’t know at the start of 2017 (about time crystals) (<https://bit.ly/2CNvSCn>)
5. The 10 Most Significant Scientific Breakthroughs of 2017. Dec 30, 2017 (about time crystals) Bigthink.com ([https://bit.ly/2BZ2E0S)](https://bit.ly/2BZ2E0S%29).
6. Highlights of the Year December 18, 2017 *Physics 10, 137* (about time crystals). <https://physics.aps.org/articles/v10/137>. [PDF](https://drive.google.com/file/d/1r-kknoNn4SI-BpstkjUfm9LQb018orIy/view?usp=sharing)
7. Light, the universe and everything – 12 Herculean tasks for quantum cowboys and black diamond skiers, *Journal of Modern Optics, 2018* **65***, No. 11,* p.1261- 1308. <https://doi.org/10.1080/09500340.2018.1454525>. [PDF](https://drive.google.com/file/d/1yomhhZj_XgiPgd1iDNQL-HSwqlHyiue5/view?usp=sharing)
8. Chiral Casimir Forces: Repulsive, Enhanced, Tunable (with Qing-Dong Jiang*). Amercian Physical Society, 99(12). doi:10.1103/physrevb.99. 125403* (March 2019). MIT/CTP/5002.[PDF](https://drive.google.com/file/d/1TK1_fEkOlDgJTKo5xrJ15XkZ7_VwODM2/view?usp=sharing)
9. SO(3) Family symmetry and axions (with Mario Reig, Jose W. F. Valle*) Amercian Physical Society, 98(9). doi: Phys. Rev. D 98, 095008* (2018) MIT-CTP/5003. [PDF](https://drive.google.com/file/d/1WxhfW5in4L3_evCGEkNPJtEv6fI8qgh1/view?usp=sharing)
10. The Universality of Intelligence, in: Possible Minds: Twenty-Five Ways of Looking at AI, ed. John Brockman. (Penguin, 2018) (Book chapter)
11. Has elegance betrayed Physics. *Physics Today 71, 9, 57* (2018); (<https://doi.org/10.1063/PT.3.4022>) [PDF](https://drive.google.com/file/d/1b0j6jXl-3q52FcKBcbHqjccNC7IlAXxh/view?usp=sharing)
12. Axial Casimir Force (with Qing-Dong Jiang) Amercian Physical Society, 99(16) (2019). doi:10.1103/physrevb.99.165402 [MIT-CTP/6063]. [PDF](https://drive.google.com/file/d/1L-lUOJPoh7JYbsaCwmRffh-1aklGMv9L/view?usp=sharing)
13. Quantum Atmospherics for Materials Diagnosis (with Qing-Dong Jiang) *American Physical Society,* *99*(20) (2019). doi:10.1103/physrevb.99.201104 MIT-CTP/5056. [PDF](https://drive.google.com/file/d/1mWWHv00FSbtazr_KAFtGZqsQm3l_rpB7/view?usp=sharing)
14. Superdensity operators for spacetime quantum mechanics. (with J. Cotler, Chiao-Ming Jian., Xiao-Ling Qi) *Journal of High Energy Physics*, *2018* (9), 93. [PDF](https://drive.google.com/file/d/1sBVzPvpGdUqJXm98Fl-7bIuzL4dxHsLj/view?usp=sharing)
15. Truncated Dynamics, Ring Molecules and Mechanical Time Crystals. (with Dai Jin, Antti J. Niemi, Xubiao Peng) (2018). *Amercian Physical Society, 99(2) 023425*.  MIT-CTP/5110. [PDF](https://drive.google.com/file/d/1zod07HSvIsI5qH9Adqod9uqGXhJYO4p1/view?usp=sharing)
16. Efficient quantum algorithm for a class of 2-SAT problems (2018). (with Biao Wu, Hongye Yu) *arXiv:1812.05846*.  MIT-CTP/5109. [PDF](https://drive.google.com/file/d/1xwKff-Jfzc75fuPDUUOP3aA_89LovV2E/view?usp=sharing)
17. The evolving unity of physics. *Nature Reviews Physics***1**, 5–7 (2019). [PDF](https://drive.google.com/file/d/16GIZkMU7Pc8FG-bSAD7OhVEmFyQaDd_g/view?usp=sharing)
18. Tunable axion plasma haloscopes (2019) (with [Matthew Lawson](https://arxiv.org/search/hep-ph?searchtype=author&query=Lawson%2C+M), [Alexander J.Millar](https://arxiv.org/search/hep-ph?searchtype=author&query=J.Millar%2C+A), [Matteo Pancaldi](https://arxiv.org/search/hep-ph?searchtype=author&query=Pancaldi%2C+M), [Edoardo Vitagliano](https://arxiv.org/search/hep-ph?searchtype=author&query=Vitagliano%2C+E)) [arXiv:1904.11872](https://arxiv.org/abs/1904.11872) [hep-ph] NORDITA-2019-038, MIT-CTP-5116. [PDF](https://drive.google.com/file/d/14m05-bngGE-mjy7-A-zDglGKMaoayPG7/view?usp=sharing)
19. Color Blind Detectors Enable Chromatic Interferometry (with Luo-Yuan Qu, Jordan Cotler, Fei Ma, Jian-Yu Guan, Ming-Yang Zheng, Xiuping Xie, Yu-Ao Chen, Qiang Zhang, and Jian-Wei Pan) MIT-CTP/5111. [PDF](https://drive.google.com/file/d/1clCrXAn5dasEvTY0Psx8vphhSirbyHkL/view?usp=sharing)
20. Spectroscopy of spinons in Coulomb quantum spin liquids (2019). (with Siddhardh C.Morampudi and Chris R. Laumann) [arXiv:1906.01628](https://arxiv.org/abs/1906.01628) [cond-mat.str-el] MIT-CTP-5122.[PDF](https://drive.google.com/file/d/1WlHkTH4tTh_M_feIWr6WEO_uDa6SCLWr/view?usp=sharing)
21. Regularizations of Time Crystal Dynamics (with Alfred Shapere). *Proceeding of the National Academy of Sciences* 1908758116  <https://doi.org/10.1073/pnas> [**arXiv:1708.03348**](https://arxiv.org/abs/1708.03348)[cond-mat.stat-mech]. MIT-CTP/4926. [PDF](https://drive.google.com/file/d/1t4kYvu6WleYcN760ncFeBBxGe9xHkbUr/view?usp=sharing)
22. Tunable Axion Plasma Haloscopes (with Lawson, Matthew, Millar, Alexander J, Pancaldi, Matteo and Vitagliano, Edoard)Phys. Rev. Lett. 123, 141802 520 (2019) <https://doi.org/10.1103/PhysRevLett.123.141802>. [PDF](https://drive.google.com/file/d/1z5lqwwF08Jhu1jb69kHGB6zm3droFqMi/view?usp=sharing)

Synopsis: A new Plasma-Based Axion Detector. [PDF](https://drive.google.com/open?id=1YBzwhV4_ZYQbl-qlW9CeCu0zTni38iWk)