

Curriculum Vitae

Howard Georgi

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BORN

January 6, 1947
San Bernardino, California

MARITAL STATUS

Married, two children

DEGREES

June 1967 B.A., Harvard College
Graduated magna cum laude
with highest honors in
chemistry and physics.

June 1971 Ph.D. Yale University
Honorary Sterling Fellow.

POSITIONS

1971-73 Research Fellow, Harvard University.

1973-76 Junior Fellow, Society of
Fellows, Harvard University.

1976-80 Associate Professor of Physics
Harvard University.

1980- Professor of Physics.

1982-98 Senior Fellow, Harvard Society of Fellows.

1982-2004 Editor, Physics Letters B.

1991-94 Chair, Department of Physics.
Harvard University.

1992- Mallinckrodt Professor of Physics.

1998-2015 Master of Leverett House.

2002- Head Tutor in Physics and
Chemistry and Physics Concentrations.

2005-10 Harvard College Professor.

2016-18 Faculty Dean of Leverett House.

COMMITTEES AND BOARDS

- 1983-86 BNL High Energy Advisory Committee.
- 1992-95 LBL Physics Division Visiting Committee.
- 1993-94 SSC Laboratory PAC.
- 1994-98 FNAL PAC — chair 97-98.
- 1994-97 Annual Reviews Editorial Board.
- 1994-97 American Physical Society Committee on the Status of Women in Physics.
- 1995-98 Executive Committee, American Physical Society Forum on Education.
- 1996-99 Vice Chair, Chair Elect and Chair — Division of Particles and Fields of the American Physical Society.
- 1996-99 Co-chair — Committee on Women in Science and Engineering, National Research Council.
- 2002-06 External Advisor to the Hunter College Gender Equity Project.
- 2006- Boston University Women in Science and Engineering, Advisory Board.

FELLOWSHIPS AND HONORS

- 1971-73 NSF Postdoctoral Fellow.
- 1976-80 Alfred P. Sloan Foundation Fellow.
- 1982- Fellow, American Academy of Arts and Sciences.
- 1994- Fellow, American Physical Society Division of Particles and Fields *for innovative work in particle physics including the standard model, QCD, $SU(2)\times U(1)$ symmetry breaking, and GUTs.*
- 1995 Sakurai Prize, American Physical Society. *For his pioneering contributions to the unification of strong and electroweak interactions, and for his application of quantum chromodynamics to the properties and interactions of hadrons.*
- 1995- National Academy of Sciences.
- 1999 Levenson Memorial Teaching Award.
- 2000 Dirac Medal from the Abdus Salam International Centre for Theoretical Physics. *for pioneering contributions to the quest for a unified theory of quarks and leptons and of the strong, weak, and electromagnetic interactions.*
- 2002 Phi Beta Kappa Teaching award from α - ι of Massachusetts.
- 2004 Levenson Memorial Teaching Award (first repeat winner).
- 2006 Pomeranchuk Prize from the Institute for Theoretical and Experimental Physics — Moscow *for the unification of Interactions and the understanding of the Standard Theory.*
- 2009 Fellow, Association for Women in Science *for his pioneering and sustained advocacy of women in physics.*
- 2016 Division of Particles & Fields Mentoring Award *For his unique dedication to mentoring and supporting a large and diverse community of students and post doctoral fellows, whose creative theoretical endeavors have had an enormous impact on particle physics as well as the larger scientific community.*

BOOKS

- | | |
|------|---|
| 1981 | Lie Algebras in Particle Physics
(Benjamin/Cummings, Reading, MA). |
| 1999 | Revised Edition. |
| 1984 | Weak Interactions and Modern Particle Theory
(Benjamin/Cummings, Menlo Park, CA),
Now available on my web page. |
| 1992 | The Physics of Waves
(Prentice-Hall, Inc., Englewood Cliffs, NJ)
Now available on my web page. |

Student Theses

1. Quantum Bound States in a Color-Confined Theory by William N. Celmaster, June 1977.
2. Calculations in Quark Models by Edward Henry Farhi, April 1979.
3. Predictions and Limitations of Perturbative QCD by Samuel Davis, May 1979
4. Topics in the Theory of Leptoproduction by Jonathan Lewis Sheiman, May 1979.
5. Monopoles and Dions in Grand Unified Models by Theodore Nikos Tomaras, May 1980.
6. Mass Mixing and CP Violation in the $B_0 - \bar{B}_0$ System by Jon Hagelin, April 1981.
7. Generalized Gauge Hierarchies by Sara Lynn Dawson, May 1981.
8. Decoupling and Grand Unification by Lawrence John Hall, May 1981.
9. Low Energy Supersymmetry by Robert Mark Claudson, May 1982.
10. Phenomenological Lagrangian and the Light Mesons by Andrew Charles Redfield, May 1982.
11. Large Weak Isospin and the W Mass by Peter Louis Galison, May 1983.
12. Chiral Quarks and the Non-Relativistic Quark Model by Aneesh Vasant Manohar, May 1983.
13. Functional Techniques in Superspace by Ian Norman McArthur, May 1984.
14. Spontaneously Broken CP and the Renormalization of θ , by Ann Nelson, May 1984.
15. Supersymmetries of the World by Benjamin Grinstein Aks, May 1984.
16. Topics in Elementary Particle Physics by Michael John Dugan, May 1985.
17. Family Structure of Quarks and Leptons by Michael Sup Shin, May 1985.
18. The Composite Higgs Mechanism by David Benjamin Kaplan, May 1985.

19. Effective Field Theories for Low Energy Physics by Andrew Glen Cohen, May 1986.
20. Topics in Lattice Gauge Theory by Gregory Kilcup, May 1986.
21. Light Composite Fermions by David Ariel Kosower, May 1986.
22. Consequences of Supersymmetry by Donald Arthur Spector, October 1986.
23. Applications of Effective Lagrangian by Jonathan Maitland Flynn, May 1987.
24. Composite Technicolor Standard Models by R. Sekhar Chivukula, May 1987.
25. Enhancing The Standard Model by Lisa J. Randall, May 1987.
26. Electroweak and Flavor Symmetry Breaking by Elizabeth Helen Simmons, May 1990.
27. Real and Imaginary Strong Interactions by Junegone Chay, May 1990.
28. The Heavy Quark Effective Field Theory by Adam Frederick Falk, May 1991.
29. Symmetries and Strong Interactions by Michael Eric Luke, May 1991.
30. Effective Quantum Field Theories by Peter Leslie Cho, May 1992.
31. Symmetries, Anomalies and Effective Field Theory by Vineer Bhansali, September 1992.
32. Effective Field Theory Calculation of the W and Z Masses by Anemarie DeYoung, April 1993.
33. Effective Field Theory and the Signatures of New Physics by Christopher Carone, June 1994.
34. Effective Field Theories with Instantons by Samuel Osofsky, June 1994.
35. Matching Calculation and Massless Composite Particles by Chia-Hung Vincent Chang, June 1995.
36. Topics in Effective Field Theories by Lev Kaplan, June 1996
37. Topics in High Energy Phenomenology by David Joseph Morin, June 1996.
38. Methods in QCD and Non-Perturbative Physics by Dean Junyuel Lee, June 1998.
39. Reparametrization Invariance in Heavy Quark Effective Field Theory by Matt McIrvin, June 1998.
40. An S_3 Symmetry of Non-Relativistic Quark Models and a Top Quark Seesaw model by Hael Switzer Collins, June 1999.
41. Chiral orbifold construction of field theories with extra dimensions by Girma Hailu, June 2003.
42. Topics in Little Higgs physics by Spencer Chang, June 2004.
43. Physics of Conformal Field Theories by Yevgeny Kats, June 2010.
44. Light-Shell Theory Foundations by Greg Kestin, May 2014
45. An Effective Theory on the Light Shell by Aqil Sajjad, May 2015

Some Research Accomplishments in Particle Theory:

- Constructed the $SU(5)$ grand unified theory, with Glashow. *Unity of all Elementary Particle Forces*, (with S. L. Glashow), Phys. Rev. Lett. **32** 438 (1974).
- Constructed the $SO(10)$ grand unified theory. H. Georgi, in *Particles and Fields - 1974*, Proc. of the meeting of the APS Division of Particles and Fields, Williamsburg, Virginia, ed. by CE Carlson (AIP, New York, 1975), p. 575.
- Developed the theory of coupling constant renormalization in GUTs, with Quinn and Weinberg. *Hierarchy of Interactions in Unified Gauge Theories*, (with H. Quinn and S. Weinberg), Phys. Rev. Lett. **33** 451 (1974).
- Did one of the first calculations of QCD radiative corrections, with Appelquist. e^+e^- *Annihilation in Gauge Theories of Strong Interactions*, (with T. Appelquist), Phys. Rev. **D8** 4000 (1973).
- Developed the modern QCD-motivated quark model, understood the Σ - Λ mass difference as the result of the quark mass dependence of color-magnetism, and correctly predicted the masses of the low-lying charmed particles, with De Rujula and Glashow. *Hadron Masses in a Gauge Theory*, (with A. De Rujula and S. Glashow), Phys. Rev. **D12** 147 (1975).
- Developed the theory and did one the first phenomenological analyses of scaling violation in deep inelastic lepton-hadron scattering, with Politzer, and De Rujula and Politzer. *Electroproduction Scaling in an Asymptotically Free Theory of Strong Interactions*, (with H. David Politzer), Phys. Rev. **D9** 416 (1974); *Demythification of Electroproduction Local Duality and Precocious Scaling*, Annals of Physics **103** 315 (1977).
- Developed the idea of Gluon fusion for Higgs production, with Glashow, Machacek, and Nanopoulos. *Higgs Bosons from Two Gluon Annihilation in Proton-Proton Collisions*, (with S. L. Glashow, M. Machacek, and D. V. Nanopoulos), Phys. Rev. Lett. **40** 692 (1978).
- Helped develop the modern theory of perturbative QCD, with Politzer and others. *Clean Tests of QCD in $\mu - P$ Scattering*, (with H. D. Politzer), Phys. Rev. Lett. **40** 3 (1978); *Perturbation Theory and the Parton Model in QCD*, (with R. K. Ellis, M. Machacek, H. D. Politzer, and G. G. Ross), Nucl. Phys. **B152** 285 (1979).
- Helped develop the modern view of effective field theories. *Effective Field Theory*, in **Annual Review of Nuclear and Particle Science**, ed. J. D. Jackson, vol. 43, 209 (1994)
- Constructed an $SU(5)$ GUT with softly broken supersymmetry, with Dimopoulos. This work laid the foundation for the supersymmetric standard model and predicted $\sin^2 \theta$ in agreement with present day precise tests. *Softly Broken Supersymmetry and $SU(5)$* , (with S. Dimopoulos), Nucl. Phys. **B193**, 150 (1981).
- Developed the chiral quark model, with Manohar. *Chiral Quarks and the Nonrelativistic Quark Model*, (with A. Manohar), Nucl. Phys. **B234**, 189 (1984).

- Developed the theory of composite Higgs bosons, with Kaplan and Dimopoulos. *SU(2)×U(1) Breaking by Vacuum Misalignment*, (with D. Kaplan), Phys. Lett. **136B**, 183 (1984); *Composite Higgs Scalars*, (with D. Kaplan and S. Dimopoulos), Phys. Lett. **136B**, 187 (1984).
- Constructed simple composite models with massless fermions. *A Tool Kit For Builders of Composite Models*, Nuclear Physics **B266**, 274 (1986).
- Constructed technicolor models without flavor-changing neutral current problems, with Chivukula and Randall. *A Composite Technicolor Standard Model of Quarks*, (with R.S. Chivukula and L. Randall) Nucl. Phys. **B292**, 93 (1987).
- Developed the heavy quark effective field theory. *An Effective Field Theory for Heavy Quarks at Low Energies*, Phys. Lett. **B240**, 447 (1990).
- Found a class of 4-dimensional field theories in which extra dimensions arise dynamically, providing a new slant on the meaning of space. *(De)constructing dimensions*, (with N. Arkani-Hamed and A.G. Cohen) Phys. Rev. Lett. **86**, 4757 (2001).
- Constructed the first “little higgs” model, in which the Higgs boson is a pseudo-Goldstone boson without fine tuning. *Electroweak symmetry breaking from dimensional deconstruction*, (with N. Arkani-Hamed and A.G. Cohen) Phys. Lett. **B513**, 232 (2001).
- Suggested a way of searching for scale invariant matter not describable in terms of particles in “Unparticle physics,” Phys. Rev. Lett. 98 (2007) 221601, hep-ph/0703260; “Another Odd Thing About Unparticle Physics,” Phys. Lett. B650 (2007) 275278, arXiv:0704.2457 [hep-ph]

References

- [1] H. Georgi and J. M. Rawls, “Anomalies of the axial-vector current in two dimensions,” *Phys. Rev.* **D3** (1971) 874–879.
- [2] H. Georgi, “Energy-momentum tensors and scale invariance in the thirring model,” *Phys. Rev.* **D2** (1970) 2908–2911.
- [3] H. Georgi and S. L. Glashow, “Gauge theories without anomalies,” *Phys. Rev.* **D6** (1972) 429.
- [4] H. Georgi and S. L. Glashow, “Unified weak and electromagnetic interactions without neutral currents,” *Phys. Rev. Lett.* **28** (1972) 1494.
- [5] H. Georgi and S. L. Glashow, “Attempts to calculate the electron mass,” *Phys. Rev.* **D7** (1973) 2457–2463.
- [6] H. Georgi and S. L. Glashow, “Spontaneously broken gauge symmetry and elementary particle masses,” *Phys. Rev.* **D6** (1972) 2977–2982.
- [7] H. Georgi, “Anomalies of the axial-vector currents in a thirring model with internal symmetry,” *Phys. Rev.* **D4** (1971) 2254–2259.

- [8] H. Georgi and T. Goldman, "Baryon mass differences in a gauge model of strong and electromagnetic interactions," *Phys. Rev. Lett.* **30** (1973) 514–517.
- [9] H. Georgi, "Gauge model of vector-meson masses," *Phys. Rev.* **D7** (1973) 1258–1280.
- [10] H. Georgi and S. L. Glashow, "Gauge theory of weak and electromagnetic interactions with han-nambu quarks," *Phys. Rev.* **D7** (1973) 561–563.
- [11] T. Appelquist and H. Georgi, " $e^+ e^-$ annihilation in gauge theories of strong interactions," *Phys. Rev.* **D8** (1973) 4000–4002.
- [12] H. Georgi and S. L. Glashow, "Pseudo-cabibbo structure in a gauge theory of weak interactions and electromagnetism," *Phys. Lett.* **B44** (1973) 191–194.
- [13] H. Georgi and A. Pais, "Cp - violation as a quantum effect," *Phys. Rev.* **D10** (1974) 1246.
- [14] H. Georgi, "The state of the art - gauge theories. (talk)," *AIP Conf. Proc.* **23** (1975) 575–582.
- [15] A. De Rujula, H. Georgi, S. L. Glashow, and H. R. Quinn, "Fact and fancy in neutrino physics," *Rev. Mod. Phys.* **46** (1974) 391–407.
- [16] A. De Rujula, H. Georgi, and H. D. Politzer, "The breakdown of scaling in neutrino and electron scattering," *Phys. Rev.* **D10** (1974) 2141.
- [17] H. Georgi and H. D. Politzer, "Electroproduction scaling in an asymptotically free theory of strong interactions," *Phys. Rev.* **D9** (1974) 416–420.
- [18] H. Georgi and S. L. Glashow, "Unity of all elementary particle forces," *Phys. Rev. Lett.* **32** (1974) 438–441.
- [19] H. Georgi, H. R. Quinn, and S. Weinberg, "Hierarchy of interactions in unified gauge theories," *Phys. Rev. Lett.* **33** (1974) 451–454.
- [20] H. Georgi and A. Pais, "Calculability and naturalness in gauge theories," *Phys. Rev.* **D10** (1974) 539.
- [21] A. De Rujula, H. Georgi, and S. L. Glashow, "Hadron masses in a gauge theory," *Phys. Rev.* **D12** (1975) 147–162.
- [22] A. De Rujula, H. Georgi, and S. L. Glashow, "Are heavy leptons found?," *Phys. Rev. Lett.* **35** (1975) 628.
- [23] A. De Rujula, H. Georgi, and S. L. Glashow, "Changing the charmed current," *Phys. Rev. Lett.* **35** (1975) 69.
- [24] H. Georgi, "Unified gauge theories. (talk)". In *Coral Gables 1975, Proceedings, Theories and Experiments In High Energy Physics*, New York 1975, 329-339.
- [25] H. Georgi and A. Pais, "Vacuum symmetry and the pseudogoldstone phenomenon," *Phys. Rev.* **D12** (1975) 508.

- [26] A. De Rujula, H. Georgi, and S. L. Glashow, "Vector model of the weak interactions," *Phys. Rev.* **D12** (1975) 3589.
- [27] A. De Rujula and H. Georgi, "Counting quarks in $e^+ e^-$ annihilation," *Phys. Rev.* **D13** (1976) 1296–1301.
- [28] A. De Rujula, H. Georgi, and H. D. Politzer, "Trouble with ξ scaling?," *Phys. Rev.* **D15** (1977) 2495.
- [29] A. De Rujula, H. Georgi, and H. D. Politzer, "An explanation of local duality and precocious scaling," *Phys. Lett.* **B64** (1977) 428.
- [30] A. De Rujula, H. Georgi, and S. L. Glashow, "Charm spectroscopy via electron - positron annihilation," *Phys. Rev. Lett.* **37** (1976) 785.
- [31] R. M. Barnett, H. Georgi, and H. D. Politzer, "Can asymptotic freedom explain the neutrino anomalies?," *Phys. Rev. Lett.* **37** (1976) 1313.
- [32] A. De Rujula, H. Georgi, and S. L. Glashow, "Molecular charmonium: A new spectroscopy?," *Phys. Rev. Lett.* **38** (1977) 317.
- [33] A. De Rujula, H. Georgi, and H. D. Politzer, "Demythification of electroproduction, local duality and precocious scaling," *Ann. Phys.* **103** (1977) 315.
- [34] H. Georgi and H. D. Politzer, "Freedom at moderate energies: Masses in color dynamics," *Phys. Rev.* **D14** (1976) 1829.
- [35] H. Georgi and H. D. Politzer, "Precocious scaling, rescaling and ξ scaling," *Phys. Rev. Lett.* **36** (1976) 1281.
- [36] J. Banks and H. Georgi, "Comment on gauge theories without anomalies," *Phys. Rev.* **D14** (1976) 1159–1160.
- [37] A. De Rujula, H. Georgi, and S. L. Glashow, "Is charm found?," *Phys. Rev. Lett.* **37** (1976) 398.
- [38] A. De Rujula, H. Georgi, and S. L. Glashow, "Model of neutrino induced multi - lepton events," *Phys. Rev.* **D17** (1978) 151.
- [39] A. De Rujula, H. Georgi, and S. L. Glashow, "Three models of weak interactions confront experiment," HUTP-77/A046.
- [40] H. Georgi, "The use and misuse of the drell-yan formalism," *Phys. Rev.* **D17** (1978) 3010.
- [41] H. M. Georgi, S. L. Glashow, M. E. Machacek, and D. V. Nanopoulos, "Higgs bosons from two gluon annihilation in proton proton collisions," *Phys. Rev. Lett.* **40** (1978) 692.
- [42] H. Georgi and A. Pais, "Natural stepwise breaking of gauge and discrete symmetries," *Phys. Rev.* **D16** (1977) 3520.
- [43] S. Davis, E. Farhi, and H. Georgi, "Kinematical scaling violation at fixed energy," *Phys. Lett.* **B71** (1977) 191.

- [44] H. Georgi and H. D. Politzer, "Quark decay functions and heavy hadron production in qcd," *Nucl. Phys.* **B136** (1978) 445.
- [45] A. De Rujula, H. Georgi, and S. L. Glashow, "Ambidextrous theory of the weak interactions," *Ann. Phys.* **109** (1977) 242.
- [46] H. Georgi, "The winner of the vector model look alike contest," Presented at Orbis Scientiae, Coral Gables, Fla., Jan 17- 21, 1977.
- [47] A. De Rujula, H. Georgi, and S. L. Glashow, "A theory of flavor mixing," *Ann. Phys.* **109** (1977) 258.
- [48] H. Georgi and M. Machacek, "A simple qcd prediction of jet structure in $e^+ e^-$ annihilation," *Phys. Rev. Lett.* **39** (1977) 1237.
- [49] W. Celmaster, H. Georgi, and M. Machacek, "Potential model predictions for the upsilon particles," *Phys. Rev.* **D17** (1978) 886.
- [50] H. Georgi and H. D. Politzer, "Clean tests of qcd in mu p scattering," *Phys. Rev. Lett.* **40** (1978) 3.
- [51] W. Celmaster, H. Georgi, and M. Machacek, "Potential model of meson masses," *Phys. Rev.* **D17** (1978) 879.
- [52] H. Georgi and S. Weinberg, "Neutral currents in expanded gauge theories," *Phys. Rev.* **D17** (1978) 275.
- [53] H. Georgi and A. Pais, "Generalization of gim: Horizontal and vertical flavor mixing," *Phys. Rev.* **D19** (1979) 2746.
- [54] H. Georgi and D. V. Nanopoulos, "t quark mass in a superunified theory," *Phys. Lett.* **B82** (1979) 392.
- [55] H. Georgi, "How to include parton transverse momentum in qcd," *Phys. Rev. Lett.* **42** (1979) 294.
- [56] H. M. Georgi, S. L. Glashow, M. E. Machacek, and D. V. Nanopoulos, "Charmed particles from two - gluon annihilation in proton proton collisions," *Ann. Phys.* **114** (1978) 273.
- [57] H. Georgi, "The use and misuse of the parton model," Presented at Orbis Scientiae, Coral Gables, Fla., Jan 15- 20, 1978.
- [58] H. Georgi and D. V. Nanopoulos, "Suppression of flavor changing effects from neutral spinless meson exchange in gauge theories," *Phys. Lett.* **B82** (1979) 95.
- [59] R. K. Ellis, H. Georgi, M. Machacek, H. D. Politzer, and G. G. Ross, "Factorization and the parton model in qcd," *Phys. Lett.* **B78** (1978) 281.
- [60] H. Georgi and J. Sheiman, "Transverse momentum distributions in lepton - hadron scattering from qcd," *Phys. Rev.* **D20** (1979) 111.
- [61] R. K. Ellis, H. Georgi, M. Machacek, H. D. Politzer, and G. G. Ross, "Perturbation theory and the parton model in qcd," *Nucl. Phys.* **B152** (1979) 285.

- [62] H. Georgi, "How to observe quarks and gluons," *Hadronic J.* **1** (1978) 1227–1249.
- [63] H. Georgi, "A model of soft cp violation," *Hadronic J.* **1** (1978) 155.
- [64] H. Georgi, "Comment on unconfined quarks and gluons," *Phys. Rev.* **D22** (1980) 225.
- [65] H. Georgi and C. Jarlskog, "A new lepton - quark mass relation in a unified theory," *Phys. Lett.* **B86** (1979) 297–300.
- [66] H. Georgi and D. V. Nanopoulos, "Ordinary predictions from grand principles: t quark mass in $o(10)$," *Nucl. Phys.* **B155** (1979) 52.
- [67] H. Georgi and M. Machacek, "B meson decay and partial unification of strong, electromagnetic and weak interactions," *Phys. Rev. Lett.* **43** (1979) 1639.
- [68] H. Georgi and D. V. Nanopoulos, "Masses and mixing in unified theories," *Nucl. Phys.* **B159** (1979) 16.
- [69] H. Georgi, "Towards a grand unified theory of flavor," *Nucl. Phys.* **B156** (1979) 126.
- [70] H. Georgi and S. L. Glashow, "A quixotic interpretation of the upsilon particle," *Nucl. Phys.* **B159** (1979) 29.
- [71] H. Georgi, "Grand unification of qcd," HUTP-79/A058.
- [72] H. Georgi and S. L. Glashow, "Making do without the t quark," *Nucl. Phys.* **B167** (1980) 173.
- [73] H. Georgi, "A modest proposal for eliminating the gauge hierarchy problem in unified theories," *Hadronic J.* **2** (1979) 568.
- [74] S. Dawson and H. Georgi, "Generalized gauge hierarchies," *Phys. Rev. Lett.* **43** (1979) 821.
- [75] H. Georgi, T. Tomaras, and A. Pais, "Strong cp violation without instantons," *Phys. Rev.* **D23** (1981) 469–472.
- [76] S. Dawson and H. Georgi, "Unification of effective field theories," *Nucl. Phys.* **B179** (1981) 477.
- [77] H. Georgi and S. L. Glashow, "Unified theory of elementary particle forces," *Phys. Today* **33N9** (1980) 30–39.
- [78] H. Georgi and M. Machacek, "Mass rescaling in unified theories," *Nucl. Phys.* **B173** (1980) 32.
- [79] M. Claudson, H. Georgi, and A. Yildiz, "Neutral $su(2)$ and neutral currents," *Phys. Lett.* **B96** (1980) 340.
- [80] H. Georgi, "Why unify?," *Nature* **288** (1980) 649–651.
- [81] H. Georgi, S. L. Glashow, and M. Machacek, " μ^+ polarization in proton decay: A probe of flavor mixing in unified models," *Phys. Rev.* **D23** (1981) 783.
- [82] A. De Rujula, H. Georgi, and S. L. Glashow, "Flavor goniometry by proton decay," *Phys. Rev. Lett.* **45** (1980) 413.

- [83] H. Georgi, "Fermion masses in unified theories,". Presented at First Workshop on Grand Unification, Durham, N.H., Apr 10-12, 1980.
- [84] H. Georgi, "Supersymmetric guts. (talk)," . Harvard Univ. Cambridge - HUTP-81-A039 (81,REC.OCT.) 10p.
- [85] H. Georgi and I. N. McArthur, "Instantons and the mu quark mass,". HUTP-81/A011.
- [86] H. Georgi, "Composite / fundamental higgs mesons. 2. model building," *Nucl. Phys.* **B202** (1982) 397.
- [87] H. Georgi and I. N. McArthur, "Composite / fundamental higgs mesons. 1. dynamical speculations," *Nucl. Phys.* **B202** (1982) 382.
- [88] H. Georgi, "Comments on heavy z's and a peculiar grand unified theory. (talk)," . In *Ithaca 1981, Proceedings, Z0 Theory*, 522-528.
- [89] H. Georgi, L. J. Hall, and M. B. Wise, "Remarks on mass hierarchies from tumbling gauge theories," *Phys. Lett.* **B102** (1981) 315.
- [90] H. Georgi, "The case for and against new directions in grand unification,". In *Kyoto 1981, Proceedings, Grand Unified Theories and Related Topics*, 109-141.
- [91] H. M. Georgi, S. L. Glashow, and S. Nussinov, "Unconventional model of neutrino masses," *Nucl. Phys.* **B193** (1981) 297.
- [92] H. M. Georgi, L. J. Hall, and M. B. Wise, "Grand unified models with an automatic peccei-quinn symmetry," *Nucl. Phys.* **B192** (1981) 409.
- [93] M. B. Wise, H. Georgi, and S. L. Glashow, "Su(5) and the invisible axion," *Phys. Rev. Lett.* **47** (1981) 402.
- [94] H. Georgi, "An almost realistic gauge hierarchy," *Phys. Lett.* **B108** (1982) 283.
- [95] S. Dimopoulos and H. Georgi, "Supersymmetric guts. (talk)," . In *Ann Arbor 1981, Proceedings, Grand Unification*, 285- 296.
- [96] H. Georgi, "Effective theories below a symmetry breaking scale,". To be publ. in Proc. of 4th Kyoto Summer Inst. on Grand Unified Theories and Related Topics, Kyoto, Japan, Jun 29 - Jul 3, 1981.
- [97] H. Georgi and S. L. Glashow, "Unextended technicolor and unification," *Phys. Rev. Lett.* **47** (1981) 1511.
- [98] H. Georgi, "A unified theory of elementary particles and forces," *Sci. Am.* **244** (1981) 40-55.
- [99] S. Dimopoulos and H. Georgi, "Softly broken supersymmetry and su(5)," *Nucl. Phys.* **B193** (1981) 150.
- [100] S. Dimopoulos and H. Georgi, "Solution of the gauge hierarchy problem," *Phys. Lett.* **B117** (1982) 287.

- [101] P. H. Frampton, H. Georgi, and J. E. Kim, “A useful formula for witten’s mass hierarchy,” *Phys. Lett.* **B116** (1982) 346.
- [102] H. Georgi, “Lie algebras in particle physics. from isospin to unified theories,” *Front. Phys.* **54** (1982) 1–255.
- [103] S. Dimopoulos, P. H. Frampton, H. Georgi, and M. B. Wise, “Automatic invisible axion without domain walls,” *Phys. Lett.* **117B** (1982) 185.
- [104] H. Georgi and M. B. Wise, “Hiding the invisible axion,” *Phys. Lett.* **B116** (1982) 123.
- [105] M. B. Gavela and H. Georgi, “Cp violation in the lepton sector,” *Phys. Lett.* **B119** (1982) 141.
- [106] H. Georgi and A. Manohar, “Relativistic corrections to baryon magnetic moments,” *Phys. Lett.* **B132** (1983) 183.
- [107] H. Georgi, “Grand unification,” HUTP-82-A049.
- [108] A. G. Cohen, H. Georgi, and B. Grinstein, “An effective field theory calculation of the rho parameter,” *Nucl. Phys.* **B232** (1984) 61.
- [109] D. B. Kaplan and H. Georgi, “Su(2) x u(1) breaking by vacuum misalignment,” *Phys. Lett.* **B136** (1984) 183.
- [110] S. Dimopoulos, H. Georgi, and S. Raby, “Technicolor gymnastics,” *Phys. Lett.* **B127** (1983) 101.
- [111] A. Manohar and H. Georgi, “Chiral quarks and the nonrelativistic quark model,” *Nucl. Phys.* **B234** (1984) 189.
- [112] H. Georgi, A. E. Nelson, and A. Manohar, “On the proposition that all fermions are created equal,” *Phys. Lett.* **B126** (1983) 169.
- [113] D. B. Kaplan, H. Georgi, and S. Dimopoulos, “Composite higgs scalars,” *Phys. Lett.* **B136** (1984) 187.
- [114] H. Georgi, P. H. Ginsparg, and S. L. Glashow, “Photon oscillations and the cosmic background radiation,” *Nature* **306** (1983) 765–766.
- [115] H. Georgi and D. B. Kaplan, “Composite higgs and custodial su(2),” *Phys. Lett.* **B145** (1984) 216.
- [116] H. Georgi, D. B. Kaplan, and P. Galison, “Calculation of the composite higgs mass,” *Phys. Lett.* **B143** (1984) 152.
- [117] H. Georgi and S. L. Glashow, “Is higgs found?,” *Phys. Lett.* **B143** (1984) 155.
- [118] S. Dimopoulos and H. M. Georgi, “Extended survival hypothesis and fermion masses,” *Phys. Lett.* **B140** (1984) 67.
- [119] H. Georgi, A. E. Nelson, and M. Shin, “Cp violation and fritzsch mass matrices,” *Phys. Lett.* **B150** (1985) 306.

- [120] H. Georgi, "Sneaking up on composite models," *Phys. Lett.* **B151** (1985) 57.
- [121] M. J. Dugan, H. Georgi, and D. B. Kaplan, "Anatomy of a composite higgs model," *Nucl. Phys.* **B254** (1985) 299.
- [122] H. Georgi, A. Manohar, and G. W. Moore, "Constraints on a two higgs interpretation of the zeta (8.3)," *Phys. Lett.* **B149** (1984) 234.
- [123] H. Georgi, "Opening remarks or flavor democracy and other speculations about the state of particle physics or between chemistry and mathematics,". In *Philadelphia 1983, Proceedings, Grand Unification*, 3- 12.
- [124] P. Langacker *et al.*, "Nonstandard higgs bosons,". To be publ. in Proc. of 1984 Div. of Particles and Fields Summer Study Conf., Snowmass, CO, Jun 23 - Jul 13, 1984.
- [125] M. Shin, H. Georgi, and M. Axenides, "zeta (8.3-gev) as the lightest scalar in a three higgs doublet model," *Nucl. Phys.* **B253** (1985) 205.
- [126] J. Bagger, S. Dimopoulos, H. Georgi, and S. Raby, "Theories of fermion masses,". Invited talk given at 5th Workshop on Grand Unification, Providence, RI, Apr 12-14, 1984.
- [127] H. Georgi and J. Preskill, "Composite fermions without $u(1)$ s," *Phys. Lett.* **B156** (1985) 369.
- [128] M. J. Dugan, G. B. Gelmini, H. Georgi, and L. J. Hall, "Two 17-kev majorana neutrinos?," *Phys. Rev. Lett.* **54** (1985) 2302.
- [129] H. Georgi, "A tool kit for builders of composite models," *Nucl. Phys.* **B266** (1986) 274.
- [130] H. Georgi, "Weak interactions and modern particle theory,". Menlo Park, Usa: Benjamin/cummings (1984) 165p.
- [131] H. Georgi and M. Machacek, "Doubly charged higgs bosons," *Nucl. Phys.* **B262** (1985) 463.
- [132] H. M. Georgi, "Composite higgs and composite fermions,". In *Thessaloniki 1985, Proceedings, Particles and The Universe*, 79-91.
- [133] H. Georgi, "Candidates and caveats,". In *Providence 1984, Proceedings, Grand Unification*, 2-9.
- [134] H. Georgi, " $Su(2) \times u(1) \times u(1)$ and glashow-manohar monojets," *Phys. Lett.* **B153** (1985) 294.
- [135] H. Georgi, "Composite models and guts (?) or fun with mooses,". IN *MINNEAPOLIS 1985, PROCEEDINGS, GRAND UNIFICATION* 349- 359.
- [136] A. G. Cohen, S. R. Coleman, H. Georgi, and A. Manohar, "The evaporation of q balls," *Nucl. Phys.* **B272** (1986) 301.
- [137] H. Georgi, D. B. Kaplan, and L. Randall, "Manifesting the invisible axion at low-energies," *Phys. Lett.* **B169** (1986) 73.
- [138] R. S. Chivukula, J. M. Flynn, and H. Georgi, "Polychromatic penguins don't fly," *Phys. Lett.* **B171** (1986) 453-458.

- [139] H. Georgi, "Su(2) x u(1) breaking, compositeness, flavor and guts,". Harvard Univ. Cambridge - HUTP-86-A040 (86,REC.AUG.) 11p.
- [140] M. S. Chanowitz, M. Golden, and H. Georgi, "Universal scattering theorems for strongly interacting ws and zs," *Phys. Rev. Lett.* **57** (1986) 2344.
- [141] H. M. Georgi, "Composite higgs bosons,". In *Berkeley 1984, Proceedings, Electroweak Symmetry Breaking*, 57-63.
- [142] H. Georgi, "Two thoughts on flavor,". In *La Jolla 1983, Proceedings, Problems In Unification and Supergravity*, 73-76.
- [143] H. Georgi and L. Randall, "Flavor conserving cp violation in invisible axion models," *Nucl. Phys.* **B276** (1986) 241.
- [144] H. Georgi, "The flavor problem," *Phys. Lett.* **B169** (1986) 231.
- [145] R. S. Chivukula and H. Georgi, "Doubly charged pseudogoldstone bosons and dynamical su(2) x u(1) breaking," *Phys. Lett.* **B182** (1986) 181-186.
- [146] H. M. Georgi, "Unification and particle physics,". IN *BATAVIA 1986, PROCEEDINGS, QUARKS, QUASARS, AND QUANDARIES* 117-139.
- [147] H. Georgi, "Model of jet energy flow with application to w searches," *Phys. Rev. Lett.* **59** (1987) 2001-2004.
- [148] H. Georgi, "A little toy w,". HUTP-87/A055.
- [149] R. S. Chivukula, H. Georgi, and L. Randall, "A composite technicolor standard model of quarks," *Nucl. Phys.* **B292** (1987) 93-108.
- [150] R. S. Chivukula and H. Georgi, "Composite technicolor standard model," *Phys. Lett.* **B188** (1987) 99.
- [151] H. Georgi, L. Randall, and D. A. Kosower, "Approximate global symmetries of the electroweak interactions," *Phys. Lett.* **B194** (1987) 87.
- [152] H. Georgi, L. Randall, and D. A. Kosower, "Quark mass matrices without small parameters," *Nucl. Phys.* **B296** (1988) 717.
- [153] H. Georgi, "A little toy jet," *Phys. Lett.* **B195** (1987) 581.
- [154] M. S. Chanowitz, M. Golden, and H. Georgi, "Low-energy theorems for strongly interacting ws and zs," *Phys. Rev.* **D36** (1987) 1490.
- [155] V. Bhansali and H. Georgi, "Neutrino majorana masses in a composite technicolor standard model," *Phys. Lett.* **B197** (1987) 553.
- [156] H. Georgi, "Particle distributions in jets," *Phys. Lett.* **B199** (1987) 134.

- [157] R. S. Chivukula and H. Georgi, "Phenomenology of composite technicolor standard models," *Phys. Rev.* **D36** (1987) 2102.
- [158] H. Georgi, "Antenna patterns and jets," *Nucl. Phys.* **B312** (1989) 645.
- [159] H. Georgi, "A technicolor model with softly broken flavor symmetry," *Nucl. Phys.* **B307** (1988) 365.
- [160] A. G. Cohen, H. Georgi, and E. H. Simmons, "A comment on suzuki's model for composite vector mesons," *Phys. Rev.* **D38** (1988) 405.
- [161] H. Georgi, "An extended technicolor model with custodial su(2) symmetry," *Phys. Lett.* **B216** (1989) 155.
- [162] A. G. Cohen and H. Georgi, "Walking beyond the rainbow," *Nucl. Phys.* **B314** (1989) 7.
- [163] H. Georgi, "Electroweak symmetry breaking theory,". Prepared for 1988 DPF Summer Study on High-energy Physics in the 1990s (Snowmass 88), Snowmass, CO, 27 Jun - 15 Jul 1988.
- [164] R. S. Chivukula, A. G. Cohen, H. Georgi, B. Grinstein, and A. V. Manohar, "Higgs decay into goldstone bosons,". Prepared for 1988 DPF Summer Study on High-energy Physics in the 1990s (Snowmass 88), Snowmass, CO, 27 Jun - 15 Jul 1988.
- [165] H. Georgi, "Flavor su(3) symmetries in particle physics," *Phys. Today* **41N4** (1988) 29–37.
- [166] H. Georgi, E. H. Simmons, and A. G. Cohen, "Finding gauges where $z(p)$ equals one," *Phys. Lett.* **B236** (1990) 183.
- [167] R. S. Chivukula, A. G. Cohen, H. Georgi, B. Grinstein, and A. V. Manohar, "Higgs decay into goldstone bosons," *Annals Phys.* **192** (1989) 93–103.
- [168] H. Georgi, "New realization of chiral symmetry," *Phys. Rev. Lett.* **63** (1989) 1917–1919.
- [169] H. Georgi, E. Jenkins, and E. H. Simmons, "Ununifying the standard model," *Phys. Rev. Lett.* **62** (1989) 2789.
- [170] H. M. Georgi, "Grand unified theories,". IN *DAVIES, P. (ED.): THE NEW PHYSICS* 425-445.
- [171] H. M. Georgi, "Effective quantum field theories,". IN *DAVIES, P. (ED.): THE NEW PHYSICS* 446-457.
- [172] H. Georgi, "Vector realization of chiral symmetry," *Nucl. Phys.* **B331** (1990) 311–330.
- [173] H. Georgi, E. Jenkins, and E. H. Simmons, "The ununified standard model," *Nucl. Phys.* **B331** (1990) 541.
- [174] R. S. Chivukula, A. G. Cohen, H. Georgi, and A. V. Manohar, "Couplings of a light higgs boson," *Phys. Lett.* **B222** (1989) 258–262.
- [175] H. Georgi and M. B. Wise, "Superflavor symmetry for heavy particles," *Phys. Lett.* **B243** (1990) 279–283.

- [176] H. Georgi, "Comment on heavy baryon weak form-factors," *Nucl. Phys.* **B348** (1991) 293–296.
- [177] J. Chay, H. Georgi, and B. Grinstein, "Lepton energy distributions in heavy meson decays from qcd," *Phys. Lett.* **B247** (1990) 399–405.
- [178] H. Georgi and F. Uchiyama, "Vector symmetry breaking in charmed meson decays," *Phys. Lett.* **B247** (1990) 394–398.
- [179] H. Georgi, "Strongly coupled gauge theories,". Summary talk given at Conf. SCGT 90, Nagoya, Japan, Jul 28- 31, 1990.
- [180] H. Georgi, B. Grinstein, and M. B. Wise, "Lambda(b) semileptonic decay form-factors for m(c) does not equal infinity," *Phys. Lett.* **B252** (1990) 456–460.
- [181] H. Georgi, "Technicolor and families,". Presented at Conf. SCGT 90, Nagoya, Japan, Jul 28-31, 1990.
- [182] H. Georgi, "The rho as the chiral partner of the pi,". In *Nagoya 1990, Proceedings, Strong coupling gauge theories and beyond* 446-450. (see HIGH ENERGY PHYSICS INDEX 29 (1991) No. 12260).
- [183] H. Georgi and F. Uchiyama, "Vector symmetry and heavy quark decays," *Phys. Lett.* **B238** (1990) 395.
- [184] H. Georgi and L. Randall, "Charge conjugation and neutrino magnetic moments," *Phys. Lett.* **B244** (1990) 196–202.
- [185] H. Georgi, "An effective field theory for heavy quarks at low- energies," *Phys. Lett.* **B240** (1990) 447–450.
- [186] A. F. Falk, H. Georgi, B. Grinstein, and M. B. Wise, "Heavy meson form-factors from qcd," *Nucl. Phys.* **B343** (1990) 1–13.
- [187] H. Georgi and M. E. Luke, "Neutrino moments, masses and custodial su(2) symmetry," *Nucl. Phys.* **B347** (1990) 1–11.
- [188] H. Georgi, "On-shell effective field theory," *Nucl. Phys.* **B361** (1991) 339–350.
- [189] H. Georgi, "Effective field theory and electroweak radiative corrections," *Nucl. Phys.* **B363** (1991) 301–325.
- [190] H. Georgi, "A very heavy t?,". In *Boston 1991, Proceedings, Particles, strings and cosmology* 11-27.
- [191] H. Georgi, "Heavy quark effective field theory,". HUTP-91-A039.
- [192] C. Carone and H. Georgi, "Nonrelativistic chiral expansion and nonleptonic decays of octet and decuplet baryons," *Nucl. Phys.* **B375** (1992) 243–262.
- [193] H. Georgi, "Nonlocal effective field theory,". In *Dobogokoe 1991, Proceedings, Effective field theories of the standard model* 21-29.

- [194] H. Georgi, “Workshop on effective field theories: Summary talk,”. In *Dobogokoe 1991, Proceedings, Effective field theories of the standard model* 395-402.
- [195] H. Georgi, “D - anti-d mixing in heavy quark effective field theory,” *Phys. Lett.* **B297** (1992) 353–357, hep-ph/9209291.
- [196] H. Georgi, “Physics from vacuum alignment in a technicolor model,” *Nucl. Phys.* **B416** (1994) 699–721, hep-ph/9209244.
- [197] H. Georgi, F. Uchiyama, and A. Yamada, “Numerical analysis of vector symmetry breaking in charmed meson decays,” *Nucl. Phys.* **B382** (1992) 3–10.
- [198] H. Georgi, “Generalized dimensional analysis,” *Phys. Lett.* **B298** (1993) 187–189, hep-ph/9207278.
- [199] P. L. Cho and H. Georgi, “Electromagnetic interactions in heavy hadron chiral theory,” *Phys. Lett.* **B296** (1992) 408–414, hep-ph/9209239.
- [200] V. Bhansali and H. Georgi, “Running nonlocal lagrangians,” hep-ph/9205242.
- [201] H. Georgi, “Thoughts on effective field theory,” *Nucl. Phys. Proc. Suppl.* **29BC** (1992) 1–10.
- [202] H. Georgi, L. Kaplan, and D. Morin, “Nonperturbative matching for field theories with heavy fermions,” *Phys. Rev.* **D49** (1994) 2457–2461, hep-ph/9310364.
- [203] C. Carone, H. Georgi, and S. Osofsky, “On spin independence in large $n(c)$ baryons,” *Phys. Lett.* **B322** (1994) 227–232, hep-ph/9310365.
- [204] H. Georgi, “Effective field theory,”. Prepared for CCAST Symposium on Particle Physics at the Fermi Scale, Beijing, China, 27 May - 4 Jun 1993.
- [205] H. Georgi, “A bound on $m(\eta) / m(\eta\text{-prime})$ for large $n(c)$,” *Phys. Rev.* **D49** (1994) 1666–1667, hep-ph/9310337.
- [206] H. Georgi, “Why i would be very sad if a higgs boson were discovered,”. In *Kane, G.L. (ed.): Perspectives on Higgs physics* 337- 342.
- [207] C. D. Carone and H. Georgi, “Technicolor with a massless scalar doublet,” *Phys. Rev.* **D49** (1994) 1427–1436, hep-ph/9308205.
- [208] H. Georgi and S. T. Osofsky, “Effective field theories with instantons,” *Nucl. Phys.* **B420** (1994) 94–117, hep-ph/9308212.
- [209] H. Georgi, “Summary talk for dpf94,”. Prepared for 1994 Meeting of the American Physical Society, Division of Particles and Fields (DPF 94), Albuquerque, New Mexico, 2-6 Aug 1994.
- [210] H. Georgi, “Thoughts on large $n(c)$ qcd,”. Prepared for Workshop on Chiral Dynamics: Theory and Experiments, Cambridge, MA, 25-29 July 1994.
- [211] H. Georgi, “A modern view of hadrons,”. In *St. Croix 1994, Proceedings, Techniques and concepts of high-energy physics* 1-42.

- [212] H. Georgi, “Qcd.”. Prepared for CERN SMC Meeting on Internal Spin Structure of the Nucleon, New Haven, CT, 5-6 Jan 1994.
- [213] H. Georgi, L. Kaplan, D. Morin, and A. Schenk, “Effects of top compositeness,” *Phys. Rev.* **D51** (1995) 3888–3894, hep-ph/9410307.
- [214] H. Georgi, “Effective field theory,” *Ann. Rev. Nucl. Part. Sci.* **43** (1993) 209–252.
- [215] C. D. Carone, H. Georgi, L. Kaplan, and D. Morin, “Decays of $l = 1$ baryons: Quark model versus large $n(c)$,” *Phys. Rev.* **D50** (1994) 5793–5807, hep-ph/9406227.
- [216] H. Collins, H. Georgi, and D. Zeltser, “A perturbative expansion for weakly bound states,” hep-ph/9510398.
- [217] H. Georgi and S. L. Glashow, “Decays of a leptophobic gauge boson,” *Phys. Lett.* **B387** (1996) 341–345, hep-ph/9607202.
- [218] H. Collins and H. Georgi, “A little large n group theory,” *Phys. Lett.* **B394** (1997) 152–160, hep-ph/9611402.
- [219] H. Georgi and F. Uchiyama, “Vector symmetry and nonleptonic decays of b mesons.”. Prepared for 2nd International Conference on B Physics and CP Violation (BCONF 97), Honolulu, HI, 24-28 Mar 1997.
- [220] M. Finkemeier, H. Georgi, and M. McIrvin, “Reparameterization invariance revisited,” *Phys. Rev.* **D55** (1997) 6933–6943, hep-ph/9701243.
- [221] D. Lee and H. Georgi, “Sum-rule for large- $n(c)$ qcd and application to heavy quarkonia,” *Phys. Lett.* **B426** (1998) 367–374, hep-ph/9710324.
- [222] H. Georgi, J. E. Kim, and H.-P. Nilles, “Hidden sector gaugino condensation and the model-independent axion,” *Phys. Lett.* **B437** (1998) 325–330, hep-ph/9805510.
- [223] H. Georgi and S. L. Glashow, “Neutrinos on earth and in the heavens,” *Phys. Rev.* **D61** (2000) 097301, hep-ph/9808293.
- [224] H. Georgi, “Confinement iii: Overview of confinement.”. Prepared for 3rd International Conference in Quark Confinement and Hadron Spectrum (Confinement III), Newport News, Virginia, 7-12 Jun 1998.
- [225] H. Collins and H. Georgi, “ $S(3)$ and the $l = 1$ baryons in the quark model and the chiral quark model,” *Phys. Rev.* **D59** (1999) 094010, hep-ph/9810392.
- [226] R. S. Chivukula and H. Georgi, “Large- n and vacuum alignment in topcolor models,” *Phys. Rev.* **D58** (1998) 075004, hep-ph/9805478.
- [227] R. S. Chivukula and H. Georgi, “Effective field theory of vacuum tilting,” *Phys. Rev.* **D58** (1998) 115009, hep-ph/9806289.

- [228] R. S. Chivukula, B. A. Dobrescu, H. Georgi, and C. T. Hill, “Top quark seesaw theory of electroweak symmetry breaking,” *Phys. Rev.* **D59** (1999) 075003, hep-ph/9809470.
- [229] H. Georgi and S. L. Glashow, “Soft superweak cp violation and the strong cp puzzle,” *Phys. Lett.* **B451** (1999) 372–381, hep-ph/9807399.
- [230] H. Collins, A. K. Grant, and H. Georgi, “Dynamically broken topcolor at large-n,” hep-ph/9907477.
- [231] H. Georgi and S. L. Glashow, “Terrestrial neutrino oscillations illustrated,” hep-ph/9907339.
- [232] H. Collins, A. K. Grant, and H. Georgi, “The phenomenology of a top quark seesaw model,” *Phys. Rev.* **D61** (2000) 055002, hep-ph/9908330.
- [233] H. Georgi, A. K. Grant, and G. Hailu, “Brane couplings from bulk loops,” *Phys. Lett.* **B506** (2001) 207–214, hep-ph/0012379.
- [234] H. Georgi, A. K. Grant, and G. Hailu, “Chiral fermions, orbifolds, scalars and fat branes,” *Phys. Rev.* **D63** (2001) 064027, hep-ph/0007350.
- [235] H. Georgi and A. K. Grant, “A topcolor jungle gym,” *Phys. Rev.* **D63** (2001) 015001, hep-ph/0006050.
- [236] H. Georgi, “Confinement iv - summary(?)”. Prepared for 4th International Conference on Quark Confinement and the Hadron Spectrum, Vienna, Austria, 3-8 Jul 2000.
- [237] N. Arkani-Hamed, A. G. Cohen, and H. Georgi, “(de)constructing dimensions,” *Phys. Rev. Lett.* **86** (2001) 4757–4761, hep-th/0104005.
- [238] N. Arkani-Hamed, A. G. Cohen, and H. Georgi, “Twisted supersymmetry and the topology of theory space,” *JHEP* **07** (2002) 020, hep-th/0109082.
- [239] N. Arkani-Hamed, A. G. Cohen, and H. Georgi, “Anomalies on orbifolds,” *Phys. Lett.* **B516** (2001) 395–402, hep-th/0103135.
- [240] N. Arkani-Hamed, A. G. Cohen, and H. Georgi, “Electroweak symmetry breaking from dimensional deconstruction,” *Phys. Lett.* **B513** (2001) 232–240, hep-ph/0105239.
- [241] N. Arkani-Hamed, A. G. Cohen, and H. Georgi, “Accelerated unification,” hep-th/0108089.
- [242] S. Chang and H. Georgi, “Quantum modified mooses,” *Nucl. Phys.* **B672** (2003) 101–122, hep-th/0209038.
- [243] N. Arkani-Hamed, H. Georgi, and M. D. Schwartz, “Effective field theory for massive gravitons and gravity in theory space,” *Ann. Phys.* **305** (2003) 96–118, hep-th/0210184.
- [244] H. Georgi, “Deconstruction and new approaches to electroweak symmetry breaking.” Contributed to 30th SLAC Summer Institute on Particle Physics: Secrets of the B Meson (SSI 2002), SLAC, Menlo Park, California, 5-16 Aug 2002.

- [245] H. Georgi, “Fun with higgsless theories,” *Phys. Rev.* **D71** (2005) 015016, hep-ph/0408067.
- [246] G. Hailu and H. Georgi, “On exact superpotentials, free energies and matrix models,” *JHEP* **02** (2004) 038, hep-th/0401101.
- [247] H. Georgi, “Chiral fermion delocalization in deconstructed higgsless theories,” hep-ph/0508014.
- [248] P. Creminelli, H. Georgi, and N. Arkani-Hamed, “A larger than naive cut-off in a simple model,” In *Shifman, M. (ed.) et al.: From fields to strings, vol. 3* 2095-2107.
- [249] H. Georgi, “The higgs as a pseudo-goldstone boson,” *Comptes Rendus - Physique* (2007).
- [250] H. Georgi, “Unparticle Physics,” *Phys. Rev. Lett.* **98**, 221601 (2007) [arXiv:hep-ph/0703260].
- [251] H. Georgi, “Another Odd Thing About Unparticle Physics,” *Phys. Lett. B* **650**, 275 (2007) [arXiv:0704.2457 [hep-ph]].
- [252] H. Georgi and Y. Kats, “An Unparticle Example in 2D,” *Phys. Rev. Lett.* **101**, 131603 (2008) [arXiv:0805.3953 [hep-ph]].
- [253] H. Georgi and Y. Kats, “Unparticle self-interactions,” arXiv:0904.1962 [hep-ph].
- [254] H. Georgi, “Unparticle physics,” *Int. J. Mod. Phys. A* **25**, 573 (2010).
- [255] H. Georgi, G. Kestin and A. Sajjad, “Color Fields on the Light-Shell,” *JHEP* **1602**, 136 (2016) doi:10.1007/JHEP02(2016)136 [arXiv:1004.1404 [hep-ph]].
- [256] H. Georgi, G. Kestin and A. Sajjad, “Photon propagator in light-shell gauge,” *Phys. Rev. D* **93**, no. 9, 096002 (2016) doi:10.1103/PhysRevD.93.096002 [arXiv:1312.1741 [hep-ph]].
- [257] H. Georgi, G. Kestin and A. Sajjad, “Towards an Effective Field Theory on the Light-Shell,” *JHEP* **1603**, 137 (2016) doi:10.1007/JHEP03(2016)137 [arXiv:1401.7667 [hep-ph]].
- [258] H. Georgi, “A Simple Alternative to Jet-Clustering Algorithms,” arXiv:1408.1161 [hep-ph].
- [259] H. Georgi, “Physics Fun with Discrete Scale Invariance,” arXiv:1606.03405 [hep-ph].
- [260] H. Georgi, “Sidney Coleman’s Harvard,” arXiv:1606.03738 [physics.hist-ph].
- [261] H. Georgi and Y. Nakai, “Diphoton resonance from a new strong force,” *Phys. Rev. D* **94**, no. 7, 075005 (2016) doi:10.1103/PhysRevD.94.075005 [arXiv:1606.05865 [hep-ph]].
- [262] H. Georgi, “Complementarity and Stability Conditions,” *Phys. Lett. B* **771**, 558 (2017) doi:10.1016/j.physletb.2017.06.008 [arXiv:1607.00369 [hep-ph]].