

## CURRICULUM VITAE for PERVEZ AMIRALI HOODBHOY

**Birth:** 11 July 1950, Karachi, Pakistan

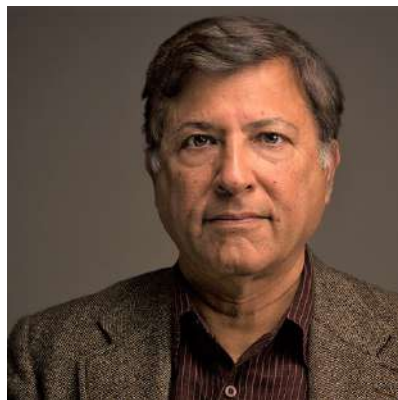
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**Marital Status:** Married, two daughters

### Education:

Karachi Grammar School:	1955--1968
B.S. (Mathematics)	Mass. Inst. of Technology (1973)
B.S. (Electrical Engineering)	Mass. Inst. of Technology (1973)
M.S. (Solid State Physics)	Mass. Inst. of Technology (1973)
Ph.D(Nuclear Physics)	Mass. Inst. of Technology (1978)



### Research Interests:

Quantum chromodynamics, hard processes, spin phenomena, supersymmetry, quark effects in nuclei, many body theory, conformal field theory, physics of extra dimensions, holography, topology and quantum mechanics.

### Work Experience:

1. 2012-2020: Distinguished Professor of Physics and Mathematics, Forman Christian College-University, Lahore.
2. 2010-2012: Professor of Physics, LUMS University, Lahore.
3. 1973-2010: Professor of Physics, Quaid-e-Azam University, Islamabad (start as lecturer).

### Short-Term Post-Doc and Summer Visiting Positions:

1. University of Washington
2. Carnegie Mellon University
3. Massachusetts Institute of Technology
4. University of Maryland
5. CERN
6. International Center for Theoretical Physics
7. Social Sciences: Woodrow Wilson School, Program on Science and Global Security, Princeton University
8. Social Sciences: Tufts University

### Other Paid Positions:

1. Technician, Particle Optics Laboratory, M.I.T (1971)
2. Electronics Design Engineer, General Radio Corporation, Massachusetts (1972).
3. Columnist for The Express Tribune, 2011-2013.

4. Columnist for Dawn, 2014-present.

**Other Positions and Responsibilities:**

1. Chairman of Mashal, a Lahore-based non-profit organization for the publication of books on modern thought in the Urdu language. This organization has averaged one book a month for the past 25 years.
2. Council of Sponsors, *Bulletin of the Atomic Scientists*, (Chicago).
3. Council Member (former), *The Pugwash Movement*, (Nova Scotia).
4. Referee for Physical Review Letters and Physical Review C,D.
5. Occasional consultant to the World Bank on secondary education reform in Pakistan.
6. Member (former) of editorial board of INESAP (International Engineers and Scientists against Nuclear Proliferation) Bulletin, Darmstadt, Germany.
7. Local organizer of regional summer school series on arms control, technology, and peace initiatives on the Indo-Pak subcontinent.
8. Initiator and co-director of World Laboratory Project on Cosmology and High Energy Physics in Pakistan, 1988-1990.
9. Member of Educational Advisory Board, Government of Pakistan, 1999-2000.
10. Chairman, Academic Council, Textile Institute of Pakistan.
11. Member of governing board, Sustainable Development Policy Institute, Islamabad.
12. Member of governing board, Indus Valley School of Art and Architecture, Karachi.
13. Member of governing board, Developments in Literacy, Islamabad.
14. Trustee of the Hashoo Education Foundation, Islamabad.
15. Founding board member of the Eqbal Ahmad Memorial Education Foundation.
16. Member of the Permanent Monitoring Panel on Terrorism (World Federation of Scientists, Erice, Italy).
17. Member, Task Force on Madrassa Reform, Ministry of Education, Government of Pakistan.
18. Member of Governing Board, Ali Institute of Education, Lahore.
19. Member of Asia Pacific Leadership Network for Nuclear Non-Proliferation.
20. Member of the UN Secretary General's Advisory Board on Disarmament Affairs, 2013-2017.

**Awards:**

1. Baker Award for Electronics, British Association of Electronics and Radio Engineers (1968).
2. Student-of-the-Year, Pakistan Students Association of America (1972).
3. Rockefeller Mauze Fellowship for graduate studies (1973) at MIT.
4. Abdus Salam Award for Mathematics (1984).
5. Associate of the International Centre for Theoretical Physics (1986--1994).
6. Faiz Ahmed Faiz Award, awarded for contributions towards the cause of education in Pakistan (1990).
7. Recipient of "Book of the Year Award", awarded by the National Book Council of Pakistan in 1993.
8. Recipient of Fulbright Award (1997-1998) to support one year of research at the University of Maryland.

9. “Honourable Mention” awarded for my documentary film, “The Bell Tolls For Planet Earth”, at the Paris Film Festival, 2002.
10. Recipient of the Selma V. Forkosch Award in 2003 from the Council for Secular Humanism, Washington, DC.
11. Awarded the UNESCO Kalinga Prize (2003) for popularization of science. This is the most prestigious award in the field.
12. Awarded ROCASA (2007) prize for enhancing the public understanding of science, Academy of Sciences of the Developing World, Trieste, Italy.
13. Recipient of Joseph A. Burton Forum Award (2010), awarded by the American Physical Society.
14. Recipient of Dr. Jean Mayer Global Citizenship Award (2010), awarded by Tufts University.
15. Listed number 85 in Foreign Policy magazine’s list of *Top 100 Global Thinkers*, 2011.
16. Recipient of the “Sir Syed Ahmad Khan Lifetime Achievement Award for excellence in Poetry, Literature, Arts or the Sciences”, by the Aligarh Muslim University Alumni Association of New Jersey and Pennsylvania, 2016.
17. Honorary Doctorate of Law, awarded by the University of British Columbia, 2019.

#### **Books**

1. *Islam & Science: Religious Orthodoxy and the Battle for Rationality*, published by ZED Books, London, in 1991 with translations in Turkish, Malaysian, Indonesian, Arabic, Spanish, and Urdu.
2. *Proceedings of School on Fundamental Physics and Cosmology*, co-edited with A.Ali, World Scientific, Singapore, 1991.
3. *Education and the State – Fifty Years of Pakistan*, (edited) Oxford University Press, 1998.
4. *Confronting the Bomb – Pakistani and Indian Scientists Speak Out*, (edited) Oxford University Press, 2013.

#### **Social Science Publications and Newspaper Articles**

Please visit <http://eacpe.org/articles-by-pervez-hoodbhoy/>

#### **Distance Learning Physics and Popular Science Videos**

Please visit <http://eacpe.org/physics-math-tutorials/>

#### **Television Documentaries Produced and Directed**

1. Produced and anchored a 13-part television series, *Rastay Ilm Kay*, broadcast weekly in 1988 by Pakistan Television that comprehensively reviewed the problems of education in Pakistan.
2. Produced and anchored a series of 6 popular programs, *Bazm-e-Kainat* (“Living in the Cosmos”) first broadcast by Pakistan Television in 1994, and then repeatedly, which sought to demonstrate the power of scientific thinking and new scientific insights into nature.

3. Produced and anchored another series of 13 popular programs, *Asrar-e-Jehan* (Mysteries of the Universe) for Pakistan Television in 2001.
4. Produced and directed "Pakistan and India under the Nuclear Shadow" (in collaboration with Zia Mian), an anti-nuclear 32 minute video documentary, broadcast on several TV channels internationally and one national channel.
5. Produced and directed "Crossing the Lines – Kashmir, Pakistan, India", (in collaboration with Zia Mian), the first documentary (47 minutes) that looks at this difficult problem objectively. It has been broadcast on several TV channels internationally and one national channel.

### **Physics Research Publications:**

1. "Coordinate Space Solution of Hartree--Fock Equations for Axially Symmetric Nuclei" (with J. W. Negele), Nucl. Phys. A288 , 23 (1977).
2. "Time-Dependent Coupled Cluster Approximation to Nuclear Dynamics I: Application to a Solvable Model" (with J. W. Negele), Phys. Rev. C18 2380 (1978).
3. "Time-Dependent Coupled Cluster Approximation to Nuclear Dynamics II: General Formulation" (with J. W. Negele), Phys. Rev. C19 1971 (1979).
4. "Many-Body Theory and the Lipkin Model," in Second Latin American Workshop on Self-Consistent Theories of Condensed Matter (ICTP, Trieste, October, 1978).
5. "Quantum Hydrodynamics Applied to Atomic Photoabsorption," Phys.Rev. A24 3136 (1981).
6. "Pion Scattering from Aligned Deformed Nuclei," Phys. Lett. 88B 27 (1979).
7. "A Variational Approach to Dense Relativistic Matter Using Functional Techniques," Ann. Phys. 139 68 (1982).
8. "Renormalization Effects in a Field Theory of Finite Nuclei," Zeit. Physik 308 68 (1982).
9. "Mean Field Approximation for Chiral Bag Models," Phys. Rev. D26 3235 (1982).
10. "Pion-Nucleus Charge Exchange Reactions with Isobar Dynamics" (with R. A. Freeman, G. A. Miller and E. M. Henley), Phys. Rev. C27 (1983).
11. "A Relation Between Coherent Photoproduction and Nucleus Elastic Scattering" (with G. Miller), Phys. Rev. C28 848 (1983).
12. "QCD for Static Sources in the  $A^0=0$  Gauge and Schrodinger Representation-Relation to the Classical Theory," Phys. Rev. D28 956 (1983).
13. "Spherical Nucleon Bag Deformations in the Two-Nucleon System," Phys. Rev. C28 1455 (1983).
14. "Parity Mixing of Elastic Scattering Resonances: General Theory and Application to  $^{14}\text{N}$ " (with E. G. Adelberger and B. A. Brown), Phys. Rev. C30 456 (1984).
15. "The He-3 Charge Form Factor in the Quark Hybrid Model" (with L.S. Kisslinger), Phys. Lett. 146B 163 (1984).
16. "Threshold Pi-zero Photoproduction from the Skyrmion," Phys.Lett. 173B 111 (1986).
17. "Reply to `Parity-Violating Asymmetries in the Scattering of Transversely Polarized

- Protons" (with E. G. Adelberger and B. A. Brown), Phys. Rev. C33 1840 (1986).
18. "Deep Inelastic Polarized Scattering from the Cloudy Bag Model --- A Failure," Phys. Lett. 182B 277 (1986).
  19. "Charge Form Factor of H-3 and He-3 in the Hybrid Quark Hadron Model" (with L. S. Kisslinger and W.-h. Ma), Nucl. Phys. A459 645 (1986).
  20. "Quark Exchange Effects on H-3 and He-3 Charge Densities," Nucl. Phys. A465 637 (1987).
  21. "Quark Exchange Contributions in Nuclei and the EMC Effect" (with R. L. Jaffe), Phys. Rev. D35 113 (1987).
  22. "Can the Quenching of Axial Coupling in Nuclei be Attributed to Excess Gluons?," J. Phys. G13 253 (1987).
  23. "Quark Exchange Contribution to the EMC Effect in Nuclear Matter" (with Arifuzzaman and S. Hidayat Hasan), Phys. Rev. C38 498 (1988).
  24. "The Swelling of Nucleons and Quark Antisymmetrization" (with Arifuzzaman and Sajjad Mahmood), Nucl. Phys. A480 469 (1988).
  25. "Quark Exchange and the Expansion of Length Scales Inside Nuclei," Prog. Nucl. Part. Phys. V20 289 (1988).
  26. "Extended Length Scales in Nuclear Matter from Quark Antisymmetrization," in Physics and Astrophysics of Quark-Gluon Plasma (World Scientific, Singapore, 1988), p.539.
  27. "Quark Antisymmetrization as a Mechanism for Increased Length Scales in Nuclei," in Proceedings of the Conference `Nuclear and Particle Physics on the Light Cone, Los Alamos National Laboratory (World Scientific, Singapore, 1988), p.111.
  28. "Berry's Phase for Atomic Levels," Phys. Rev. A38 3766 (1988).
  29. "Novel Effects in Deep Inelastic Scattering from Spin-One Hadrons," (with R. L. Jaffe and A. Manohar), Nucl. Phys. B312 571 (1989).
  30. "Polarized Photoproduction from Nuclear Targets with Arbitrary Spin and Relation to Deep-Inelastic Scattering," Nucl. Phys. A507 698 (1990).
  31. "Effect of Quark Antisymmetrization on the Binding Energy of Nuclear Matter" (with M. Nzar), Phys. Rev. C42 483 (1990).
  32. "Probing QCD Using Nuclear Targets, in Proceedings of the Fourth Regional Conference on Mathematical Physics 268, (1990).
  33. "Spin Structure Functions of Nuclei in the QCD Parton Recombination Model," (with Rafia Ali), Phys. Rev. D43 715 (1991).
  34. "Deep Inelastic Scattering from Spinning Nuclei," in Proceedings of the School on Fundamental Physics and Cosmology, A. Ali and P. Hoodbhoy, eds. (World Scientific, Singapore, 1991).
  35. "Twist-Four Corrections to Deep Inelastic Lepton Scattering from a Polarized Spin- One Target," (with R. L. Jaffe and Eric Sather), Phys. Rev. 3071 (1991).
  36. "A Convenient Parameterization of Deuteron Structure Functions," (with Hafsa Khan), Phys. Rev. C44 1219 (1991).
  37. "On the Possible Measurement of Gluon Asymmetry in a Spinning Nucleus," (with M. A. Yusuf), J. Phys. G17 , 1637 (1991).
  38. "Estimation of the Double Helicity Flip Deuteron Structure Function," (with M.

- Nzar), Phys. Rev. D45 2264 (1992).
39. "Isospin Violation of Quark Distributions in the Delta(1232)," (with M. Ayyaz), J. Phys. G18 L167 (1992).
  40. "Measuring Nuclear Gluon Shadowing through 3-Jet Production in Electron-Nucleus Collisions," (with M. Nzar) J. Phys. G18 1911 (1992).
  41. "Gluonic Transverse Spin Structure Functions and Their Possible Measurement in  $\pi^0$  Production," (with Rafia Ali), Z.Phys C57 , 325 (1993).
  42. "Shadowing of Deuteron Spin Structure Functions," (with Hafsa Khan), Phys.Lett B298 181 (1993).
  43. "Multi-Parton Light-Cone Distributions in Transversely Polarized Protons", Proceedings of Particles And Nuclei International Conference, PANIC 93, 535-537, (1993).
  44. "Twist-Four Distributions in a Transversely Polarized Nucleon and the Drell-Yan Process," (with X.D.Ji), Phys.Rev. D50 4429 (1994).
  45. "Quark Fragmentation Functions in a Diquark Model for Proton and Lambda Hyperon Production," (with M.Nzar), Phys.Rev. D51 32 (1995).
  46. "Novel Approach to Decays, Gluon Distributions, and Fragmentation Functions of Heavy Quarkonia," (with R.Ali), Phys.Rev. D51 32, (1995).
  47. "Systematic Gauge Invariant Approach to Heavy Quarkonium Decays," (with H.Khan), Phys.Rev. D53 2534 (1996).
  48. "Relativistic and Binding Energy Corrections to Direct Photon Production in Upsilon Decay", (with M.A.Yusuf) Phys.Rev. D54, 1 Sept.(1996).
  49. "Spin Structure of the Nucleon in the Asymptotic Limit", (with X.Ji and H.Tang), Phys.Rev.Lett. 76 740 (1996).
  50. "Beyond the Colour-Singlet Model for Inelastic J-Psi Photoproduction" (with H.Khan), Phys. Lett. B 382, 189, (1996).
  51. "Wavefunction corrections and off-forward gluon distributions in diffractive J-Psi production", Phys.Rev.D56:388-393, (1997).
  52. " Helicity Flip Off Forward Parton Distributions Of The Nucleon." (with X. Ji), Phys.Rev.D58:054006, (1998).
  53. "Quark Orbital Angular Momentum Distribution In The Nucleon.", (with X.Ji and W.Lu) Phys.Rev.D59:014013, (1999).
  54. "Implications Of Color Gauge Symmetry For Nucleon Spin Structure", (with X.Ji and W.Lu), Phys.Rev.D59:074010, (1999).
  55. "Nucleon Quarkonium Elastic Scattering And The Gluon Contribution To Nucleon Spin", Phys.Rev.Lett.82:4985-4987, (1999).
  56. "Does The Gluon Spin Contribute In A Gauge Invariant Way To Nucleon Spin?", (with X.Ji) Phys.Rev.D60:114042, 1999.
  57. Electroproduction of transversely polarized vector mesons via a quantum mechanical anomaly, (with W. Lu) e-Print Archive: hep-ph/9902286.
  58. "Explicit Proof That Electroproduction Of Transversely Polarized Vector Mesons Vanishes In Perturbative QCD.", hep-ph/0108214, Phys.Rev.D65:077501,2002.
  59. "Probing Quark Distribution Amplitudes Through Generalized Parton Distributions At Large Momentum Transfer", (with X.Ji and F.Yuang), Phys.Rev.Lett.92:012003, 2004.

60. The Casimir effect upon a single plate, J.Phys.A38:10253-10256, 2005 and e-Print Archive: quant-ph/0411031.
61. Two-photon effect in lepton-antilepton pair photoproduction from a nucleon target using real photons, Phys.Rev.D73:054027, 2006 and e-Print Archive: hep-ph/0601182.
62. Holographic correspondence applied to vector meson emission from a heavy accelerated nucleus, Phys.Rev.D78:115015, 2008 and e-print arXiv:0809.1977 [hep-ph].
63. Quantum tunneling of electron snake states in an inhomogeneous magnetic field, Journal of Physics: Condensed Matter, Volume 30, Number 18 (2018).
64. Augmenting the Gauge-Gravity Correspondence to include Hadron Polarizabilities, Phys. Rev. D98 (2018), 086017
65. Instability induced by exchange forces in a 2-D electron gas in a magnetic field with uniform gradient, Journal of Physics: Condensed Matter, Vol.33, No.6, 2020.

#### **Invited Talks, Colloquia, and Seminars in Physics**

1. Centre for Theoretical Physics, Massachusetts Institute of Technology.
2. University of Maryland
3. Brookhaven National Laboratory, New York
4. Jefferson Laboratory, Virginia
5. Los Alamos National Laboratory, New Mexico
6. Syracuse University
7. University of Rochester
8. University of Chicago
9. Bartol Research Institute, Delaware
10. Indiana University, Bloomington
11. Centre for European Nuclear Research (CERN, Geneva)
12. Davidson College, North Carolina
13. Institute for Nuclear Theory, Seattle.
14. American Physical Society, Washington DC.
15. DESY, Hamburg
16. International Centre for Theoretical Physics, Trieste
17. Particles and Nuclei Conference (PANIC, Perugia)
18. The Free University (Amsterdam, Holland)
19. Osaka University, Japan
20. Tata Institute for Fundamental Research, Bombay
21. IISC, Bangalore
22. William and Mary College, Virginia
23. Stanford Linear Accelerator
24. University of Washington