

Professor Virendra Singh
List of Publications
(arranged subjectwise)

Elementary Particles and High Energy Physics:

1. On the Interaction Hamiltonian of Symmetric Pseudoscalar Meson Theory
Nuovo Cimeno 11, 800-804 (1959).
2. Theory of $\pi - N$ Scattering in the Strip Approximation to the Mandelstam Representation
(with B.M. Udgaonkar)
Phys. Rev. 123, 1487-1495 (1961).
3. Self Consistent Model for Non-Leptonic Decays of lambda and sigma Hyperons
(with B.M. Udgaonkar)
Phys. Rev. 126, 2248-2251 (1962).
4. Analyticity in the Complex Angular Momentum Plane of the Coulomb Scattering Amplitude
Phys. Rev. 127, 632-636 (1962)
Reprinted in
 - (i) E.J. Squires, Complex Angular Momenta and Particle Physics, (W.A. Benjamin, Inc., New York, 1963)
 - (ii) Series of Selected Papers in Physics (147), Edited by R. Kubo (Physical Society of Japan, Tokyo).
5. Vector Charge and Magnetic Moment Form Factors of Nucleon
(with B.M. Udgaonkar)
Phys. Rev. 128, 1820-2822 (1962).
6. Regge Poles and Asymptotic Behaviour in the Analytic Continuation of the Pion Nucleon Scattering Amplitude (Ph.D. Thesis)
UCRL-10254 (1962).
7. Regge Poles in πN Scattering and in $\pi + \pi \rightarrow N + \bar{N}$.
Phys. Rev. 129, 1889-1896 (1963).

8. Theory of the $J = 3/2, I = 3/2$ πN Resonance
(with B.M. Udgaonkar)
Phys. Rev. 130, 1177-1179 (1963).
9. Regge Poles and Complex Singularities
(with J.M. Cornwall and K.T. Mahanthappa)
Phys. Rev. 131, 1882-1888 (1963).
10. Leptonic Hyperon Decays and Unitary Symmetry
(with J.M. Cornwall)
Phys. Rev. Letters 10, 551-553 (1963).
11. Elementary Particles of Conventional Field Theory as Regge Poles. IV
(with M. Gell-Mann, M.L. Goldberger, F.E. Low and F. Zachariasen)
Phys. Rev. 133, B161-B174 (1964).
12. Generalization of the Reciprocal Bootstrap Mechanism between Nucleon and $(3, 3)$ $\pi - N$ isobar to the SU(3) Octet Symmetry Model
Nuovo Cimeno 33, 763-768 (1964).
13. Sum Rules for the Decay of the Baryon Decuplet into the Baryon and Meson Octets in Broken SU(3) Symmetry
(with V. Gupta)
Phys. Rev. 135, B1442-1444 (1964),
14. Sum Rules for Coupling Constants in Broken SU(3) Symmetry
(with V. Gupta)
Phys. Rev. 136, B782-786 (1964).
15. Splittings of Spin-Unitary Spin Supermultiplets
(with M.A.B. Bég)
Phys. Rev. Letters 13, 418-421 (1964) and 13, (E) (1964).
16. Splitting of 70-plet of SU(6)
(with M.A.B. Bég)
Phys. Rev. Letters 13, 509-511 (1964).
17. Electromagnetic level shifts for Baryons in SU(6) Symmetry
(TIFR Report 1964).

18. Reciprocal Bootstrap Possibilities for Baryons
(with L.A.P. Balázs and B.M. Udgaonkar)
Phys. Rev. 139, B1313-B1318 (1965).
19. Baryon Bootstrap Possibilities in SU(6)
(with B.M. Udgaonkar)
Phys. Rev. 139, B1585-1587 (1965).
20. SU(9) Symmetry of Baryon and Mesons
Phys. Rev. Letters 15, 271-274 (1965).
21. Internal Symmetries and Finite Groups
(with S.K. Bose)
(TIFR Report 1965).
22. SU(n) Crossing Matrices for Baryon-Meson Scattering
(with H.S. Mani, G. Mohan and L.K. Pande)
Annals of Physics 36, 285-307 (1966).
23. Lie Group of the Strong-Coupling Theory I. Calculations of the Coupling-Constant Ratios and Magnetic Moments for Symmetric Pseudoscalar-Meson Theory
Phys. Rev. 144, 1275-1279 (1966).
24. Lie Group of the Strong Coupling Theory II. Equivalence with Static Bootstrap Theory and Application to Pion-Hyperon Scattering
(with B.M. Udgaonkar)
Phys. Rev. 149, 1164-1171 (1966).
25. Bootstrap and Symmetries.
Proceedings of the 9th Symposium on Cosmic Rays, Elementary Particle Physics and Astrophysics 1965, 459-477 (1966).
26. Lectures on Unitary Symmetry and its Application to Particle Physics.
Delivered at University of Delhi, Delhi (Delhi University Report 1966).
27. Strong Coupling Theory of Chew-Low Model (TIFR Report, 1966).
28. Lie Group of the Strong Coupling Theory III. Dynamical Generation of Extra Internal Symmetry for a Class of Representations
(with P. Babu and A. Rangwala)
Phys. Rev. 157, 1322-1326 (1967).

29. Fubini Sum Rule and Analyticity in Angular Momentum Plane
Phys. Rev. Letters 18, 36-39 (300 [E]) (1967).
30. New Low Energy Theorem for Compton Scattering
Phys. Rev. Letters 19, 730-734, (1967).
31. Multiplet Structure and Mass Sum Rules in the SU(6) Symmetry Scheme.
Symposia on Theoretical Physics, Vol. 4, 23-33. Edited by A. Ramakrishnan (Plenum Press, New York, 1967).
32. Low Energy Theorems for Compton Scattering giving higher order terms in frequency.
Proceedings of the 1967 International Conference on Particles and Fields, Rochester. Edited by C.R. Hagen, G. Guralnik and V.S. Mathur, 462-468 (Interscience Publishers, New York, 1967).
33. New Low Energy Theorems for Nucleon Compton Scattering
Phys. Rev. 165, 1532-1534 (1968).
34. Low Energy Theorems to Fourth Order in e for Compton Scattering
(with S.M. Roy)
Phys. Rev. Letters 21, 861-864 (1968).
35. Particle Physics - A Survey.
Proceedings of the 10th DAE Symposium on Cosmic Ray, Elementary Particle Physics and Astrophysics 1967 (1968).
36. (book review) Advances in Particle Physics
Vol.2 Editors: R.L. Cool and R.E. Marshak (Interscience Publishers, John Wiley & Sons, New York, 1968, xii+734pp, \$24.95.
Indian Journal of Physics, 43, 365 (1969)
37. Upper bounds on the elastic differential crosssection
(with S.M. Roy)
Annals of Physics 57, 461-480 (1970).
38. Unitarity upper bound on the Absorptive Part of Elastic Scattering Amplitude
(with S.M. Roy)
Phys. Rev. Letters 24, 28-33 (1970).

39. Unitarity Upper and Lower Bounds on the Absorptive Parts of Elastic Scattering Amplitudes
(with S.M. Roy)
Phys. Rev. D1. 2638-2651 (1970).
40. Upper Bounds on Particle-Antiparticle Total Cross-Section Differences at High Energies
(with S.M. Roy)
Phys. Letters 32B, 50-54(1970).
41. High Energy Bounds on Scattering Amplitudes and Oscillations in the Diffraction Peak Region
Phys. Rev. Letters 26, 530-534 (1971).
42. Exact Results in the Analytic S-Matrix Theory of Strong Interactions for High Energies:
 - (i) Field and Quanta, 1, 151-170 (1971)
 - (ii) 'The Past Decade in Particle Theory'. Edited by E.C.G. Sudarshan and Y. Ne'eman, 161-170 (Gordan and Breach, London, 1973).
43. Asymptotic Bounds on the Absorptive Parts of the Elastic Scattering Amplitudes
(with A.S. Vengurlekar)
Phys. Rev. D5, 2310-2315 (1972).
44. Validity of Scaling-Relations between Nucleon Form-Factors
Phys. Rev. Letters 28, 859-862 (1972).
45. Low Momentum-transfer Theorems e^\mp (or μ^\mp) - Charged Hadron Scattering and New Tests of Quantum Electrodynamics
(with S.M. Roy)
BNL, 16992 (June 1972)
46. Fluctuation Theorem for the Feynman Fluid Model of Inclusive Reactions
(with V. Gupta)
Letters al. Nuovo Cimento 7, 755-778 (1973).

47. Exact Results in the Analytic S-Matrix Theory.
Proceedings of the 1st Symposium on High Energy Physics, IIT-Powai,
Bombay (Dec. 12-16, 1972), 269-291 (1973).
48. Do we have increasing Total Crosssections at High Energies?
Physics News, 4, 19 (1973).
49. Advances in High Energy Physics, Vol.1
Editors: S.M. Roy and Virendra Singh
Tata Institute of Fundamental Research, Bombay (Proceedings, Dal-
housie, June 1973).
50. Advances in High Energy Physics, Vol.2
Editors: S.M. Roy and Virendra Singh
Tata Institute of Fundamental Research, Bombay (Proceedings, Dal-
housie, June 1973).
51. ψ -Particles, SU4 and Anomalous Currents
(with T. Das, P.P. Divakaran and L.K. Pandit)
Phys. Rev. Letters 34, 770-773 (1975).
52. The ψ -Particles in an SU4 Scheme with Anomalous Currents
(with T. Das, P.P. Divakaran and L.K. Pandit)
Pramāna 4, 105-129 (1975).
53. Bounds on Elastic Absorptive Parts
Annals of Physics, 92, 377-394 (1975).
54. Universal Theory of Weak Interactions in the Paracharge Scheme and
Quark-Lepton Analogy
(with T. Das, P.P. Divakaran and L.K. Pandit)
Pramana 5, 85-100 (1975).
55. Rigorous Sum Rules and Bounds on Pion-Pion Scattering Lengths
(with S.M. Roy)
Physics Letters, 60B, 67-70 (1975).
56. Rigorous Sum Rules and Bounds on Pion-Pion Scattering Amplitudes
with Positivity
(with S.M. Roy)
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57. Approaches to High Energy Physics.
Physics News 7, 78-87 (1976).
58. "Nuclear and Particle Physics – Part A : Background and Symmetries
by H. Frauenfelder and D.M. Henley,
W.A. Benjamin Inc. Reading, Massachusetts, 1975, xviii+573pp, \$21.50
(cloth), #13.50 (paper).
Current Science 45, 237-238 (1976).
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(with T. Das, P.P. Divakaran and L.K. Pandit)
Pramana 7, 113-125 (1976).
60. A Lower Bound on the Pionic Contribution to the Muon Magnetic
Moment
(with A.K. Raina)
Journal of Physics G (Nuclear Phys.) 3, 315-320 (1977).
61. Unitarity Bounds on Elastic Absorptive Amplitudes involving total
Cross Sections, Slope and Curvature Parameters
(with A.K. Raina)
Physics Letters 67B, 327-329 (1977).
62. Exact Results in Strong Interactions Dynamics.
Proceedings of the 3rd High Energy Physics Symposium, Bhubaneswar,
Orissa (Nov.1-5, 1976), Vol.II, 235-261 (1977).
63. Advances in High Energy Physics, Vol.3
Editors: Virendra Gupta and Virendra Singh
Tata Institute of Fundamental Research, Bombay (1979) (Proceedings,
Panchgani, December 1977).
64. Exact Solutions of a Meiman Problem with an Application to the Pionic
Contribution to the Muon Magnetic Moment
(with A.K. Raina)
Nucl. Phys. B139, 341-364 (1978).

65. High Energy Theorems on Diffraction Scattering of Hadrons.
 Proceedings of the International Conference and Winter School on
 Frontiers of Theoretical Physics. Edited by F.C. Auluck, L.S. Kothari
 and V.S. Nanda (The MacMillan Co. of India Ltd., Delhi), 97-106
 (1978).
66. Unitarity Restrictions of Meson-Nucleon Helicity-Flip Amplitude and
 Slope of the Diffraction Peak
 (with G. Mennessier and S.M. Roy)
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67. Unitarity Bounds on Elastic Absorptive Amplitudes Involving Total
 Cross-Section, Slope and Curvature Parameter II
 (with A.K. Raina)
 Journal of Physics G. Nuclear Physics 5, 1019-1031 (1979).
68. Bounds on Form Factors and Propagators
 (Notes by A.K. Raina of lectures given by V. Singh at Winter School
 of High Energy Physics, Panchgani (December 12-31, 1977).
 Fortschritte der Physik, 27, 561-579 (1979).
69. Basic Forces of Nature and their Unification
 Science Today, Vol.14, No.1, 19-23 (January 1980).
70. Towards a Grand Unification
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71. An Estimate of the Mass of Antineutrino of Electron Type from Tritium
 Beta Decay
 Physics News, 11, 93 (1980).
72. (book review) Elementary Particle Physics : An Introduction
 By D.C. Cheng and G.K. O'Neill (Addison-Wesley Publishing Co.,
 Reading, Massachusetts 1979), pp.viii+443, \$29.50
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73. Factorisation Limit on Photon-Photon Cross-section
 (with K.V.L. Sarma)
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74. Effective Baryon-Lepton Coupling and the Proton Decay Modes
(with K.V.L. Sarma)
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75. Fractionally Charged Atomic Systems and the Stanford Quark Search Experiments
(with V. Gupta)
Phys. Letters 112B, 251-254 (1982).
76. On $n \rightarrow p + e + \nu_e$
(with V. Gupta and S. Pakvasa)
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77. Effective Baryon-Lepton Coupling approach for the proton decay.
International Colloquium on Baryon Non-Conservation - ICOBAN, 1982. Edited by V.S. Narasimham, Pramana Supplement. Published by The Indian Academy of Sciences, Bangalore, 1982.
78. H. Yukawa
Patrika, June 1982.
79. (book review) Neutrino Physics and Astrophysics
Editor: E. Fiorini (Plenum Press, New York and London, 1982) pp.xii+421.
Journal of Scientific and Industrial Research, Delhi, 41, 636-637 (1982).
80. Helicity Conservation and Absence of Bound States of Fermion Monopole System
(with A.P. Balachandran and S.M. Roy)
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81. Grand Unification and the Big-Bang Cosmology
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82. A Glimpse of the Weak Vector Boson and a Hint of the Top Quark
(with D.P. Roy)
Physics News, 14, 56-58 (1983).
83. (book review) The New Aspects of Subnuclear Physics
Editor: A. Zichichi (Plenum Press, New York and London, 1980) \$75.00
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84. (book review) Annual Review of Nuclear and Particle Science, Vol.32 (1982).
 Editors: J.D. Jackson, H.E. Gove, R.F. Schwitters (Annual Review Inc., Palo Alto, California, 1982).
 Current Science, 52, 895 (1983).
85. Contribution to General Discussion at XVIII Solvay Conference on High Energy Physics, Univ. of Texas at Austin (November 1982)
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86. Supersymmetry and Sypergravity, Nonperturbative QCD:
 Proceedings, Mahabaleshwar, India, 1984
 Editors: Probir Roy and Virendra Singh
 Lecture Notes in Physics No.208, Springer-Verlag, Berlin, Heidelberg (1984).
87. (book review) Annual Review of Nuclear and Particle Science, Vol.33 (1983).
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88. Fractionally Charged Non-leaking Dyons and Fermions in a Bag
 (with S.M. Roy)
 Pramana 24, 611-618 (1985).
89. Bosonic String Theories with New Boundary Conditions
 (with S.M. Roy)
 Pramana 26, L85-91 (1985).
90. H.J. Bhabha : His contribution to Theoretical Physics
 In Homi Jehangir Bhabha: Collected Scientific Papers. Editors: B.V. Sreekantan, Virendra Singh and B.M. Udgaonkar, p.xxii-xivii.
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91. Exactly Soluble Problems in Condensed Matter and Relativistic Field Theory:
 Proceedings, Panchgani, India (1985)
 Editors: B.S. Shastri, S.S. Jha and V. Singh
 Springer-Verlag, Berlin, Heidelberg (1986).
92. Quantisation of Nambu-Goto Strings with New Boundary Conditions
 (with S.M. Roy)
 Phys. Rev. D33, 3792-3795 (1986).
93. Rise and fall of the Baryon Number
 In 'Cosmic Pathways'. Essays written in honour of Prof. B.V. Sreekantan on his 60th birthday. Edited by R. Cowsik, p.3-10 (Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 1986).
94. The Quasi-Open String
 (with S.M. Roy)
 Phys. Rev. D35, 1939-1942 (1987).
95. Low Momentum-Transfer Theorems for e^\pm (or μ^\pm) Charged Hadron Scattering and New Tests of Quantum Electrodynamics
 (with S.M. Roy)
 Indian J. Phys. 61B (1987) (S.N. Biswas Festschrift Issue) = #48
96. Interacting Quasi-Open Strings
 (with S.M. Roy)
 Phys. Rev. D36, 1827-1829 (1987).
97. String Theories with New Boundary Conditions
 (with S.M. Roy), in
 - (i) Strings, Lattice Gauge Theory, High Energy Phenomenology, Edited by V. Singh and S.R. Wadia, World Scientific, Singapore (1987), p. 220-233;
 - (ii) Proceedings of the 2nd Asia-Pacific Physics Conference, Bangalore 1986, Edited by S. Chandrasekhar, Vol.1, p.380-393, World Scientific, Singapore (1987).

98. Strings with New Boundary Conditions and New Dual Amplitudes
(with S.M. Roy), in
International Workshop on Superstrings, Cosmology, Composite Structures, Edited by S.J. Gates Jr. and R.N. Mohapatra, p.135-146, World Scientific, Singapore (1987).
99. Strings Lattice Gauge Theory, High Energy Phenomenology
Editors: V. Singh and S.R. Wadia
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100. Ramond-Neveu-Schwarz String with New Boundary Conditions
(with S.M.. Roy)
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101. Quasi-open and Quasi-closed Strings
(with S.M. Roy), in
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H.S. Mani and R. Ramachandra, p.219-236, World Scientific, Singapore
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102. High Energy Theorems
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Rigorous Methods in Particle Physics (Andre Martin Festschrift) Editors:
S. Ciulli, F. Schech and W. Thirring, Springer Tracts in Modern
Physics, Vol.119, p.38-52 (1990); Springer-Verlag, Berlin, etc.
103. Baryon-Anti-Baryon Asymmetry in the Universe,
MAEER's MIT Pune Journal, 1, #2, 28-32 (May-July 1992).
104. Magnetic Monopoles
Indian Journal of Physics 67 (Spl.) 45-57 (1993) [Commemoration
volume on Professor Meghnad Saha (1893-1956)].
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Chapter 8 in Physics in India: A Status Report 1994, Editor: S.S. Jha,
Indian National Science Academy, New Delhi, p.82-89 (1994).

Quantum Physics Applications:

(except to elementary particles and high energy physics)

1. Ground-State Energy of Boson Gas
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2. The Anharmonic Oscillator and the Analytic Theory of Continued Fractions
(with S.N. Biswas and K. Datta)
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3. Analytic Continued Fraction Theory for a Class of Confinement Potentials
(with S.N. Biswas and K. Datta)
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4. A Class of Exact Solutions for Doubly Anharmonic Oscillators
(with Anita Rampal, S.N. Biswas and K. Datta)
Letters in Mathematical Physics 4, 131-134 (1980).
5. Higher Order JWKB Expressions for the Energy Level and the Wave function at the Origin
(with J. Pasupathy)
Z. Phys. C. - Particles and Fields 10, 23-27 (1981).
6. Schrödinger Lumps
(with S.M. Roy)
Journal of Physics A. 14, 2927-2941 (1981).
7. Continued Fraction Theory of the Rotating Harmonic Oscillator
(with S.N. Biswas and K. Datta)
J. Math. Phys. 23, 1323-1326 (1982).
8. Generalised Coherent States and the Uncertainty Principle
(with S.M. Roy)
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9. Exact solution of Schrödinger Equation in Aharonov-Bohm plus Dirac-Monopole Potential
(with S.M. Roy)
Phys. Rev. Letters 51, 2069-2072 (1983).

10. Time Dependent Aharonov-Bohm Hamiltonian and Admissibility Criteria of Quantum Wave Functions
(with S.M. Roy)
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11. Soliton and Boundary Condition Induced Fractional Fermion Number
(with S.M. Roy)
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12. Fractional Total-Charge Eigenvalue for a Fermion in a Finite One Dimensional Box
(with S.M. Roy)
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13. Soliton and Boundary Condition Induced Fractional Fermion Number
(with S.M. Roy)
Pramana 23, 332-342 (1984).
14. Fractional Total-Charge Eigenvalue for a Fermion in a Finite One Dimensional Box
(with S.M. Roy)
Phys. Letters 143B, 179-182 (1984).
15. Conformally Invariant Field Theories in Two Dimensions and Corresponding Statistical Mechanical Models
(with B.S. Shastri)
Pramana, 25 519-524 (1985).
16. Exactly Soluble Problems in Condensed Matter and Relativistic Field Theory:
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17. Proceedings of the Second Asia-Pacific Physics Conference, Bangalore 1986 Vol.1-2
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 Indore, India, pp.xii+300
 Editors: Virendra Singh and Siddheshwar Lal
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19. An Aharonov-Bohm like Effect for Simply Connected Regions arising
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 (with S.M. Roy)
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20. The “Herbst Hamiltonian” and the mass of boson stars
 (with J.C. Raynal, S.M. Roy, A. Martin and J. Stubbe)
 Phys. Letters B, 320, 105-109 (1994).
21. Quantum Statistics of Particles
 - (i) Physics News 25, #1, 3-12 (March 1994);
 - (ii) ASAPAP (Association of Asia-Pacific Physical Societies) Bul-
 letin 4, #2, 13-18 (June 1994).
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 by Fred Cooper, Avinash Khare and Uday Sukhatme,
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Foundations of Quantum Theory:

1. Experimental Tests of Quantum Mechanics Versus Local Hidden Variable Theories
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2. Completeness of Tests of Local Hidden Variable Theories
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3. Foundations of Quantum Mechanics
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In 'Gravitation, Quanta and Universe' Edited by A.R. Prasanna et.al.
(Wiley Eastern, New Delhi 1980) 230-238.
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Niels Bohr - A Profile. Edited by A.N. Mitra, L.S. Kothari, V. Singh and S.K. Trehan,
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4. Quantum Physics: Some Fundamental Aspects, in
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5. Hidden Variable Theories without Non-local Signalling and their Experimental Tests
(with S.M. Roy)
Phys. Letters A, 139, 437-441 (1989).
6. Generalised Beable Quantum Field Theory
(with S.M. Roy)
Phys. Letters B234, 117-120 (1990).
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9. Quantum violation of stochastic noncontextual hidden variable theories
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Phys. Rev. A48, 3379-3382 (1993).
10. Experimental Consequences of Stochastic Noncontextual hidden variable theories
(with S.M. Roy)
Vistas in Astronomy 37,317-320 (1993).
11. Einstein-Podolsky-Rosen Correlations
In Recent Developments in Quantum Optics, Edited by R. Inguwa, p.37-42, Plenum Press, New York (1993).
12. Causal Quantum Mechanics treating Position and Momentum Symmetrically
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 - (i) Proceedings of the International Colloquium on Modern Quantum Field Theory II, Editors: S.R. Das, G. Mandal, S. Mukhi and S.R. Wadia, p.249-255, World Scientific, Singapore (1995).
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 - (i) Indian Journal of Physics, 71 (Spl) 355-368 (1997).
 - (ii) Pramana, journal of physics 49, 5-16 (1997).
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17. Bell inequalities in phase space and their violation in quantum mechanics
(with G. Auberson,G. Mahoux and S.M. Roy)
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18. Bell inequalities in four dimensional phase space and the three marginal theorem
(with G. Auberson, G. Mahoux and S.M. Roy)
Journal of Mathematical Physics 44, 2729-2747 (2003)
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In Proceedings of the Sixth International Conference on Quantum Communication, Measurement and Computing
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20. Marginal distributions in $(2N)$ -dimensional phase space and the quantum $(N + 1)$ marginal theorem
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Journal of Mathematical Physics 45, 4832-4854 (2004).
21. Quantum Mechanics and Reality,
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22. Joint Probabilities reproducing three EPR Experiments on two Qubits,
(with S.M. Roy, D. Atkinson, G. Auberson and G. Mahoux),
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