

SCIENTIFIC BIBLIOGRAPHY

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EXPERIMENTAL WORK

1. “Total and Differential Cross Section for $\pi^-p \rightarrow \eta^0n$ from Threshold to 1300 MeV” (with W. B. Richards, et al), Phys. Rev. Letters **16**, 1221 (1966).
2. “Pion-Proton Charge Exchange Scattering from 500 to 1300 MeV” (with others), Phys. Rev. **156**, 1415 (1967). Thesis work.
3. “Branching Ratio $\Gamma(\eta \rightarrow 3\pi^0)/\Gamma \rightarrow 2\gamma$ Measured Using a 4π Spark Chamber” (with R. J. Cence and others), Phys. Rev. Letters **19**, 1393 (1967).
4. “Production and Neutral Decay of Eta Meson in π^-p Collisions” (with W. B. Richards and others), Phys. Rev. **1D**, 10 (1970).

THEORETICAL WORK

5. “Association between the Dip in the $\pi^-p \rightarrow \pi^0n$ High Energy Angular Distribution and the Zero of the ρ Trajectory” (with Farzam Arbab), Phys. Rev. **147**, 1045 (1966).
6. “ π N Polarization and Regge Poles” (with R. J. N. Phillips and W. Rarita), Phys. Rev. **153**, 1485 (1967).
7. “Regge Pole Model for High Energy Backward π^+p Scattering” (with J. Stack), Phys. Rev. **153**, 1575 (1967).
8. “Regge Pole Model for the Secondary Maxima in π N and NN Scattering and the No-Compensation Mechanism” (with S. Y. Chu and L. L. Wang), Phys. Rev. **161** 1683 (1967).
9. “Suggestive Features in π N Charge-Exchange Polarization Associated with Regge Cuts” (with J. Finkelstein), Nuovo Cimento **48**, 820 (1967).
10. “Regge Pole Model for πp , pp , and $\bar{p}p$ Scattering” (with W. Rarita, R. Riddell, and R. J. N. Phillips), Phys. Rev. **165**, 1615 (1968).
11. “Asymptotic Behavior of Nucleon Electromagnetic Form Factors” (with M. Der Sarkissian), Nuovo Cimento **51A**, 235 (1967).
12. “Power Behavior of the Scattering Amplitude at Fixed Momentum Transfer and a Reconsideration of the Cerulus-Martin Lower-Bound” (with C. I. Tan), Phys. Rev. **162**, 1701 (1967).
13. “Large-Angle pp Scattering as an Experimental Test of the Minimal Interaction Hypothesis” (with J. Harte and C. I. Tan), Nuovo Cimento **53A**, 174 (1968).
14. “Application of Finite Energy Sum Rules to π N Scattering near the Backward Direction” (with M. Der Sarkissian), Nuovo Cimento **55A**, 396 (1968).
15. “Validity of the Interference Model for π N Scattering?” (with A. Stirling), Phys. Letters **26B** (1968); Nuovo Cimento **56A**, 805 (1968).
16. “Phase Contours of Collision Amplitudes” (with R.J. Eden and C.I. Tan), Phys. Rev. Letters **20**, 406 (1968).

17. "Phase Contours of Scattering Amplitudes I. Phase Contours, Zeros and High Energy Behavior" (R. J. Eden and C. I. Tan), *Phys. Rev.* **170**, 1490 (1968)
18. "A Hybrid Model for Elastic Scattering" (with J. Finkelstein), *Nuovo Cimento* **57A**, 649 (1968).
19. "The Hybrid Model: Further Results" (with J. Finkelstein), *Nuovo Cimento* **59A**, 92 (1969).
20. "Restrictions on SU(3) Mixing Implied by Exchange Degeneracy" (with J. Finkelstein), *Physics Letters* **27B**, 510 (1968).
21. "Loops in Partial Wave Expansion of Asymptotic Amplitudes" (with A. Kotanski), *Nuclear Physics* **B7**, 615 (1968).
22. "The Top Position of the Loops in Regge Partial Waves" (with A. Kotanski), *Nuclear Physics* **B8**, 553 (1968).
23. "Phase Contours and Bootstraps I" (with R. J. Eden, M. B. Green and F. Guerin), *Phys. Rev.* **182**, 1669 (1969).
24. "Phase Contours and Bootstraps II" (with R. J. Eden and M. B. Green), *Phys. Rev.* **185**, 1734 (1969).
25. "Nonforward Scattering of Hadrons and High Energy Phenomenology," *Rev. Mod. Phys.* **41**, 649 (1969).
26. "Factorization Properties of the Dual Resonance Model: A General Treatment of Linear Dependences" (with S. Matsuda and C. Rebbi), *Phys. Rev. Letters* **23**, 1526 (1969); *Nuovo Cimento* **67A**, 437 (1970).
27. "Regge Pole Residues near $\alpha = 0$ in the Presence of Fixed Pole Effects" (with S. Matsuda), *Physics Letters* **31B**, 455 (1970).
28. "The Gribov-Pomeranchuk Pole in the Regge Pole Residues" (with S. Matsuda), *Phys. Rev.* **D2**, 2655 (1970).
29. "Scale Invariance, Goldstone Bosons, and the f' Trajectory" (with Y. Fujii and W. W. Wada), *Nuovo Cimento Letters* **3**, 110 (1971).
30. "Determination of the Slopes of Diffraction Peaks for Hadronic Processes" (with R. C. Hwa), *Phys. Rev.* **D4**, 224 (1971).
31. "Baryon Annihilation and Exotic Exchange" (with R. C. Hwa), *Phys. Rev.* **D3**, 3078 (1971).
32. "The Role of Regge Poles and Cuts in High Energy Phenomenology". A review talk presented at APS Meeting, Austin, Texas, November 1970. (An expanded version on the same subject is published in *Nuclear Physics* **B30**, 477 (1971).
33. "Distribution of the Spins of the Resonances in the Dual Resonance Model" (with R. L. Heimann and A. Schwimmer), *Phys. Rev.* **D4**, 3177 (1971).
34. "Tests of an Empirical Rule for Cuts and Discussion of Line Reversals Relations," in *Proceedings of the Workshop on Particle Physics at Intermediate Energies*, R. D. Field, Jr. (ed.), Lawrence Radiation Laboratory, Berkeley, California, 1971.
35. "The Statistical Bootstrap Model of Hadrons with Spin" (with R. L. Heimann), *Phys. Rev.* **D4**, 3184 (1971).
36. "A Model for the Mixing Among the 70 Baryons Based on Exchange Degeneracy" (with A. N. Mitra). *Phys. Letters* **40B**, 401 (1972).

37. "Evidence for Regge Poles and Hadron Collision Phenomena at High Energies", Annual Reviews of Nuclear Science, Vol. 22, October 1972.
38. "The Meson-Baryon Elastic Polarization and the Real Part of the Nonflip Amplitude" (with W. W. Wada), Nuovo Cimento **17A**, 355 (1973).
39. "The Σ Production Data and the Absorption Pattern in Two-Body Scattering", Phys. Letters **43B**, 327 (1973).
40. "On the Mass Renormalization of a Vector Meson" (with C. C. Chiang), Nuovo Cimento **16A**, 511 (1973).
41. "A Truncated Statistical Bootstrap Equation", Nuclear Physics **B54**, 170 (1973).
42. "Analytic Solution of the Truncated Statistical Bootstrap Equation with Step Function Kernel" (with J. Johnsen), Physics Letters **42B**, 475 (1972).
43. "Bootstrap Equations for Fireball Decay" (with R. Gleiser), Nuclear Physics **B68**, 349 (1974).
44. "KNO-Scaling in Nondiffractive Multiplicity Distribution" (with K.H. Wang), Nuovo Cimento Letters **9**, 165 (1974).
45. "Independent Cluster Emission Model for High Energy Multiparticle Production" (with K. H. Wang), Phys. Rev. **D8**, 2929 (1973).
46. "Diffractive Amplitude of the Absorbed Multiperipheral-like Model Constrained by the Inclusive Transverse Momentum Distribution" (with R. Gleiser and K. H. Wang), Phys. Rev. **D10**, 2853 (1974).
47. "Absorption in Multiparticle Production and the Inclusive Transverse Momentum Distribution Based on the Absorbed Independent Emission Model" (with K. H. Wang), Nuovo Cimento **37A**, 213 (1975).
48. "Absorbed Independent Emission Model for Multiparticle Production and Diffractive Scattering in High Energy Hadron Collisions" (with K. H. Wang), Nuovo Cimento Letters **11**, 321 (1974).
49. "Empirical Fragmentation Distribution and Its Implication Based on an Independent Emission Picture" (with E. Ugaz), Nuclear Physics **B86**, 153 (1975).
50. "Hydrodynamical Model with Massless Constituents" (with K. H. Wang), Phys. Rev. **D12**, 272 (1975).
51. "Hydrodynamical Expansion with Frame Independence Symmetry in High Energy Multiparticle Production" (with E. C. G. Sudarshan and K. H. Wang), Phys. Rev. **D12**, 902 (1975).
52. "Pion Inclusive Momentum Distribution at 90° in Hydrodynamical Model" (with K. H. Wang), Phys. Rev. **D12**, 2725 (1975).
53. "Peripheral Peaking and Shrinkage Phenomenon in s-Channel Based on Statistical Bootstrap Model with Spin", Phys. Rev. **D13**, 2091 (1976).
54. "Charge Transfer Distributions Based on the Independent Emission of Neutral and Charged Clusters" (with K. H. Wang), Phys. Rev. **D13**, 3045 (1976).
55. "Rapidity Gap Distribution and Correlation Formation Based on a B-cluster Model" (with K. H. Wang), Phys. Rev. **D13**, 3052 (1976).
56. "Topological Dual Bootstrap Model and Hadron Collisions" (with M. Hossain and D. Tow), Phys. Rev. **D14**, 3141 (1976).

57. "Rising Pion Inclusive Cross Section and $N\bar{N}$ Cluster Production" (with D. M. Tow), Phys. Rev. **D15**, 3313 (1977).
58. "Experimental Confirmation of the Parity of the Antiproton" (with T. E. Kalogeropoulos and E. C. G. Sudarshan), Phys. Rev. Letters **37**, 1037 (1976).
59. "Hydrodynamical Model Based on A Bag-like Lagrangian" (with C. S. Lam and K. H. Wang), Phys. Rev. **D15**, 2678 (1977).
60. "A New Space-Time Model for Hadron Nucleus Collisions at High Energies" (with G. Bialkowski and D. M. Tow), Phys. Letters **68B**, 451 (1977).
61. "Time Evolution of Quantum Unstable System and a Resolution to the Zeno's Paradox" (with B. Misra and E. C. G. Sudarshan), Phys. Rev. **D16**, 520 (1977).
62. "Predictions of Variations of the Speed of Light Measured by Stable Clocks" (with J. P. Hsu and T. N. Sherry), Phys. Rev. **D16**, 2420 (1977); see also errata.
63. "High energy Hadron-Nucleus Collisions" (with G. Bialkowski and D. M. Tow), Phys. Rev. **D17**, 862 (1978).
64. "Decaying States as Complex Energy Eigenvectors in Generalized Quantum Theory" (with E. C. G. Sudarshan and V. Gorini), Phys. Rev. **D18**, 2914 (1978).
65. "Real and Imaginary Parts of Hadronic Amplitudes, Diffractive Contribution, and the Chew-Rosenzweig Pomeron" (with D. M. Tow), Nucl. Phys. **B137**, 237 (1978).
66. "Solutions of Simple Dual Bootstrap Models Satisfying Lee-Veneziano Relation and the Smallness of Cut Discontinuities" (with M. Hossain and D. M. Tow), Phys. Rev. **D19**, 2778 (1979).
67. "Intermediate Mass Distribution of Dual Resonance Pomeron" (with S. Matsuda), Nucl. Phys. **B134**, 463 (1978).
68. "Fireball model for baryonic inclusive spectra in hadron-nuclei and nuclei-nuclei collisions at high energies" (with I. G. Bogatskaya, M. I. Gorenstein and G. M. Zinovjev), Phys. Rev. **C22**, 209 (1980).
69. "A diagrammatic approach to pair production in slowly varying and constant fields" (with S. Nussinov), Phys. Rev. **D20**, 945 (1979).
70. "Multiquark structure function and fast pion inclusive spectra" (with E. Takasugi, R. Kaul and X. Tata), Phys. Rev. **D20**, 211 (1979).
71. "Single Meson Configuration in Transverse Gauge" (with R. Kaul and E. Takasugi), Physics Letters **76B**, 615 (1978).
72. "The Spall p_t -component of Hadronic Jets based on the Chromoelectric Flux Tube Model", Proceedings of Moriond Conference, Les Arc, France, 1979.
73. "Constraint of confinement on perturbative QCD", Proceedings of Kazimierz Conference, Poland, 1979.
74. "A theorem in matter wave interferometry" (with L. Stodolsky), Phys. Rev. **D22**, 1337 (1980).
75. "A Simple Spacetime Description of High Energy Hadron Collisions" (with W. Q. Chao, Z. X. He and Don M. Tow), Phys. Rev. Letters **44**, 518 (1980).

76. “ \bar{p} -Universality in High Energy Hadron-Nucleus Collisions” (with D. M. Tow), Physics Letters **97B**, 443 (1980).
77. “A Review of DTU-Parton Model for Hadron-Hadron- and Hadron-Nucleus Collisions”, Proceedings of the XX International Conference on High Energy Physics, Madison, Wisconsin, 1980.
78. “Hadron-nucleus interactions at high energies” (with Z. He and D. M. Tow), Phys. Rev. **D25**, 2911 (1982).
79. “Comments on QCD Confinement, DTU model and Hadron-nucleus Collisions”, Proceedings on Partons in Soft-Hadronic Processes, Erice, Italy, 1981.
80. “Strong coupling transmutation of Yukawa theory” (with C. C. Chiang and E.C.G. Sudarshan), Phys. Letters **103B**, 371 (1981).
81. “Comment on the proliferation of gauge fields in a nonlinear spinor theory” (with C. C. Chiang and X. Tata), Phys. Rev. **D26**, 1800 (1982).
82. “Is the QCD gluon a composite object?” (with C. C. Chiang, E.C.G. Sudarshan and X. Tata), Phys. Rev. **D25**, 1136 (1982).
83. “QCD interaction of leptons in composite models” (with Y. B. Dai), Physics Letters **108B**, 341 (1982).
84. “Spatio Temporal Development of Hadron-Nucleus Collisions” (with P. Valanju and E.C.G. Sudarshan), Phys. Rev. **D21**, 1304 (1980).
85. “The Equivalence of the Four-point Interaction and the Yukawa Interaction: A Boson Model” (with C. C. Chiang, E.C.G. Sudarshan and X. Tata), Phys. Rev. **D26**, 2092 (1982).
86. “The Equivalence of the Four-point Interaction and the Yukawa Interaction: A Fermion Model” (with C. C. Chiang, E.C.G. Sudarshan and X. Tata), Phys. Rev. **D26**, 2114 (1982).
87. “An Operator Approach to the Strong Coupling Transmutation of a Yukawa Interaction” (with C. C. Chiang, E.C.G. Sudarshan and X. Tata), Nuclear Phys. **B204**, 306 (1982).
88. “Composite Gauge Bosons in a Nonabelian Theory” (with S. P. Chia and K. C. Chou), Physics Letters **109B**, 457 (1982).
89. “Multiplicity Distributions in Hadron-hadron Collisions Based on the Universality Ansatz” (with Q. B. Xie), Phys. Rev. **D26**, 3057 (1982).
90. “The Time Scale for the Quantum Zeno Paradox and Proton Decay” (with B. Misra and E.C.G. Sudarshan), Phys. Letters **117B**, 34 (1982).
91. “Triple Regge Interactions and Reggy Dynamics in High Energy Collisions”, Proceedings of 14th International Symposium in Multiparticle Dynamics, Lake Tahoe, 1983.
92. “Chiral Symmetry Breaking in a Composite Model with Scalars Based on Lattice Gauge Theory” (with Pisin Chen), Phys. Rev. **D30**, 797 (1984).
93. “Multiplicity Moments with Interacting Pomerons to Order ϵ^2 ” (with Sanford Wilson), Phys. Rev. **D30**, 1084 (1984).
94. “Extrapolation of Diffractive Peaks to SSE Energies”, Proceedings to the DPF Workshop on $\bar{p}p$ Options for the Supercollider, Chicago, 1984.
95. “A Comparison Between pp and $\bar{p}p$ Diffractive Peaks at and beyond ISR Energies”, Phys. Letters **142B**, 309 (1984).

96. "Finite Temperature Corrections to the van der Waals Potential" (with D. A. Dicus, B. Joseph and V. Teplitz), Phys. Rev. **A31**, 1458 (1985).
97. "Renormalization of Axial Vector Current in QCD" (with J. Pasupathy and S. Wilson), Phys. Rev. **32D**, 1786 (1985).
98. "Unitarity Constraints on the nondegenerate Majorana Neutrino Model" (with S. Nandi and U. Sarkar), Phys. Rev. Letters **55**, 2089 (1985).
99. "Determination of baryon magnetic moments from QCD sum rules" (with J. Pasupathy and S. Wilson), Phys. Rev. **33D**, 1961 (1986).
100. "Migdal-Kadanoff determination of the Gell-Mann-Low Function for Mixed Action SU(2) Lattice Gauge Theories" (with S. G. Eubank), Nuclear Phys. **B285**, 363 (1987).
101. "The Gluon Field Contribution in QCD Sum Rules for the Magnetic Moments of the Nucleons" (with J. Pasupathy and S. L. Wilson), Phys. Rev. **D36**, 1451 (1987).
102. "Determination of the Λ magnetic moment by QCD sum rules" (with J. Pasupathy, J. P. Singh and S. L. Wilson), Phys. Rev. **D36**, 1442 (1987).
103. "Update on the Determination of Baryon Magnetic Moments by QCD Sum Rule Method" (with S. L. Wilson, J. Pasupathy and J. P. Singh), Phys. Rev. **D36**, 1553 (1987).
104. "A New Fortran Program for the 9j Angular Momentum Coefficient" (with K. S. Rao and V. Rajeswari), Computer Physics Comm. **56**, 231 (1989).
105. "Algorithms for the Polynomial Zeros of Degree 2 of the 3j and 6j" (with K. S. Rao), Journal of Physics A: Math and Gen **22**, 3779 (1989).
106. "Intermittency in Branching Models" (with R. C. Hwa), Phys. Lett. **236B**, 466 (1990).
107. "Intermittency and Multifractals in Branching Models" (with R. C. Hwa), Santa Fe Workshop: Intermittency in High Energy Collisions, F. Cooper et al (eds.), World Scientific, 1990.
108. "Decay and Evolution of the Neutral Kaon" (with E. C. G. Sudarshan), Phys. Rev. **D42**, 3712 (1990).
109. "Nonstatistical Component of Multifractal Spectral Function" (with K. Fialkowski and R. C. Hwa), Mod. Phys. Lett. **A5**, 2651 (1990).
110. "Multifractal Structure of Multiparticle Production in Branching Models" (with R. C. Hwa), Phys. Rev. **D43**, 100 (1991).
111. "Intermittency and Multifractality in e^+e^- Annihilation" (with R. C. Hwa), Phys. Rev. **45D**, 2276 (1992)
112. "Upper Bound on the Higgs Mass in a One-Loop Level Unitarized Theory" (with E. C. G. Sudarshan and G. Bhamathi), DOE-252, 1991.
113. "Hamiltonian Model for the Higgs Resonance" (with E. C. G. Sudarshan and G. Bhamathi), Phys. Rev. **45D**, 884 (1992).
114. "Intermittency and Multifractality in Monte Carlo e^+e^- Annihilation," Ringberg Workshop: *Fluctuations and Fractal Structure*, R. C. Hwa, W. Ochs and N. Schmitz (eds.), World Scientific, Singapore (1992), p. 290.
115. "Relativistic Hamiltonian Model for Higgs Resonance" (with E. C. G. Sudarshan and G. Bhamathi), Proceedings of Sudarshan Workshop, 1991 (unpublished).

116. “Analytic Continuation of Quantum Systems and their Temporal Evolution” (with E. C. G. Sudarshan), Phys. Rev. **D47**, 2602 (1993).
117. “The Cascade Model: A Solvable Field Theory” (with E. C. G. Sudarshan and G. Bhamathi), Phys. Rev. **D46**, 3508 (1992).
118. “A Theory for the Neutral Kaon System” (with E. C. G. Sudarshan), in *A Gift of Prophecy*, ed. by E. C. G. Sudarshan, World Scientific Publishing Company, Singapore (1994), pp. 81-106.
119. “Perturbation Theory on Generalized Quantum Mechanical Systems” (with E. C. G. Sudarshan and G. Bhamathi), Physica **A202**, 540 (1994).
120. “Unstable System in Generalized Quantum Theory” (with E.C.G. Sudarshan and G. Bhamathi), CPP-93-23, to be published as a review article in the Journal of Chemical Physics.
121. “Dips in Partial Wave Amplitudes from Final State Interactions” (with Duane A. Dicus), Phys. Rev. **D50**, 6724 (1994).
122. “Generalized Uncertainty Relations and Characteristic Invariants for Multimode States” (with E. C. G. Sudarshan and G. Bhamathi), Phys. Rev. **A52**, 43 (1995).

PUBLICATIONS IN ARTIFICIAL INTELLIGENCE

A. Published Work

1. “Taming Intractable Branching in Qualitative Simulation” (with B. Kuipers), Proceedings of the International Joint Conference on Artificial Intelligence, Milano, Italy, 1987.
2. “Abstracting Qualitative Behaviors by Construction of Domain Maps,” to appear in the book *Artificial Intelligence, Modeling and Simulation*, L. E. Widman and K. A. Loparo (eds.), John Wiley and Sons, 1988.
3. “Intuitive Reasoning in Physics—From an Expert’s Point of View,” Japanese Society of Artificial Intelligence **4** (1989), 528.
4. “Curvature Constraints in Qualitative Simulation” (with B. Kuipers, D. Dalle Molle and D. Throop), Artificial Intelligence **51**, 343 (1991).

B. Unpublished Work

1. “Steps toward Constraining Qualitative Simulation” (with W. W. Lee and B. Kuipers), University of Texas Computer Science TR-87-44, 1987.
2. “Higher Order Derivative Constraints and a Qsim-Based Total Simulation Scheme,” University of Texas Artificial Intelligence Lab, TR-88-65, 1988.