

CURRICULUM VITAE

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NATIONALITY: USA

EDUCATION:

M.S. in Physics, University of Delhi, Delhi, India
Ph.D. in Theoretical Physics, 1982, California Institute of Technology

AWARDS:

National Science Talent Scholarship, 70 – 75, India
J. Robert Oppenheimer Fellow, 85 – 88, LANL
PI, DoE Grand Challenges Award (NERSC), 88 – 91
PI, DoE Grand Challenges Award (ACL,LANL), 92 – 96
Elected Fellow of American Physical Society 1994
PI, DoE Grand Challenges Award (ACL,NERSC), 97 – 00

RESEARCH POSITIONS:

Post-doctoral fellow at Northeastern University: 1982-1985
Honorary Post-doctoral fellow at Harvard University: 1983-1986
J. Robert Oppenheimer Fellow; Los Alamos National Laboratory: 1985-1988
Guest Professor, University of Wuppertal, March-April 1987.
Staff Scientist, T-8, Los Alamos National Laboratory, 1988 -
Visiting Lecturer, Caltech, April-June, 1991.
Program Manager for High Energy Physics at LANL, 2000-
Group Leader for High Energy Physics at LANL, 2001-

TEACHING EXPERIENCE:

Instructor for Undergraduate Physics: CALTECH 1977-1982
Northeastern University 1982-1985
Graduate Course in Physics 229c, CALTECH Spring 1991

SERVICES TO CONFERENCE/WORKSHOP ORGANIZATION

- [1] Organizer, First Workshop on MONTE CARLO RENORMALIZATION GROUP METHODS, Cornell July 1985.
(with K. G. Wilson).
- [2] Convener “Parallel Session on Lattice Gauge Theory”: 1988 DPF conference, Storrs, Connecticut (August 1988).
- [3] Convener “Parallel Session on Lattice QCD and theoretical aspects of QCD:” QUARK MATTER 88, Lennox, Massachusetts (Sept. 1988).
- [4] Member, International Advisory Committee, LATTICE 90, Tallahassee, Florida, 1990.
- [5] Director, 1994 Santa Fe Workshop, “LARGE SCALE NUMERICAL STUDIES OF QCD” July 25 - August 12, 1994
- [6] International Advisory Committee, LATTICE 97, Edinburgh, Scotland, 1997.
- [7] Scientific Director, 1997 Les Houches Summer school on “PROBING THE STANDARD MODEL OF PARTICLE INTERACTIONS”, Les Houches, France, 1997.
- [8] Local Organizing Committee, LATTICE 98, Boulder, Colorado, 1998.
- [9] Director, 1998 Santa Fe Workshop, “PERTURBATIVE AND NON-PERTURBATIVE ASPECTS OF THE STANDARD MODEL”, July 27 - August 14, 1998.
- [10] Organized ROSENFEST, Oct 31-Nov 1, 1998, Santa Fe. Symposium to celebrate the 65th birthday of Peter Rosen.
- [11] Convener “Plenary session on Lattice QCD” at the APS Centennial Meeting, Atlanta, Georgia, March 20-26, 1999.
- [12] International Advisory Committee, LATTICE 99, Pisa, Italy, 1999.
- [13] Convener, Session on “Quark Masses” at DPF 2000, The Ohio State University, August 2000.
- [14] Local Organizing Committee, LATTICE 00, Bangalore, India, August, 2000.
- [15] Organizer, “SCALING LAWS IN PHYSICS AND BIOLOGY”, Symposium in honor of Geoffrey West, Santa Fe, Dec 2000
- [15] Organizer, “CONFRONTING TERRORISM – CT2002”, Los Alamos National Laboratory, March 2002.

SERVICES TO LOS ALAMOS LABORATORY

- [1] Member, Search Committee for Theoretical Division Director, LANL, 1998-1999
- [2] Member, LANL Director’s Colloquium Committee, 2000 – 2002; Chair 2003-
- [3] Member, LANL Research Environment advisory committee, 2000-2002
- [4] Organizer, LANL Forum on International Security in the New Millenium, 2000-

EDITORIAL RESPONSIBILITIES

- [1] Editorial Board, “Parallel Computing”, Elsevier, 1999-.
- [2] Editor, “High Speed Computing”, World Scientific, 1990-
- [3] Divisional Associate Editor, Physical Review Letters, “Particles and Fields”, 2000-2002.

PUBLICATIONS IN PARTICLE PHYSICS

- [1] Beyond Leading Order QCD Perturbative Corrections to the Pion Form;
(with R.D. Field, S. Otto and L. Chang).
Nucl. Phys. **B186** (1981) 429.
- [2] Optimized Perturbation Theory: The Pion Form Factor.
Proceeding of the Conference on Perturbative QCD at Florida State University, Tallahassee; 1981, American Institute of Physics 1981.
- [3] Hadron Spectrum, Spontaneous Breaking of Z(3) and Fake Loops in Lattice SU(3);
(with A. Patel).
Phys. Lett. **124B** (1983) 94.
- [4] Monte Carlo Estimate of Hadron Masses in Lattice SU(3);
(with A. Patel).
Nucl. Phys. **B226** (1983) 152.
- [5] Exotic Mesons in Lattice QCD;
(with A. Patel and F. Fucito).
Phys. Lett. **131B** (1983) 169.
- [6] Extended Operators for Mesons in Lattice QCD;
(with A. Patel).
Phys. Lett. **131B** (1983) 425.
- [7] String Tension, Glueball Masses and Finite Size Effects in Lattice SU(3);
(with A. Patel).
Phys. Lett. **138B** (1984) 294.
- [8] An Improved Renormalization Group Transformation in 4-Dimensions;
(with R. Cordery and M.A. Novotny).
Phys. Lett. **128B** (1983) 425.
- [9] Weak Transitions in Lattice QCD;
(with R.C. Brower, M.B. Gavela and G. Maturana).
Phys. Rev. Lett. **53** (1984) 1318.
- [10] Monte Carlo Renormalization Group for SU(2) Lattice Gauge Theory;
(with R. Cordery, M. Novotny and A. Patel).
Phys. Rev. Lett. **53** (1984) 527.
- [11] Monte Carlo Renormalization Group Improved Action for SU(2) Lattice Gauge Theory;
(with A. Patel).
Phys. Rev. Lett. **53** (1984) 531.
- [12] Monte Carlo Renormalization Group for SU(3) Lattice Gauge Theory;
(with A. Patel, G. Guralnik, T. Warnock and C. Zemach).
Phys. Rev. Lett. **53** (1984) 1721.
- [13] Monte Carlo Renormalization Group Analysis of SU(2) and SU(3) Gauge Theories;
(with A. Patel).
Proceedings of the Argonne National Laboratory Workshop on Gauge Theory on a Lattice;
Argonne 1984.

- [14] The Nature of the Transition in $d = 4$ U(1) Lattice Gauge Theory;
(with R. Cordery and M. Novotny).
NUB #2654; 1984. Condensed version; *Phys. Lett.* **172B** (1986) 86.
- [15] One Loop Lattice Vacuum Energy;
(with G. Kilcup and S. Sharpe).
Phys. Lett. **147B** (1984) 339.
- [16] Monte Carlo Renormalization Group Investigations of SU(2) Lattice Gauge Theory;
(with A. Patel).
Nucl. Phys. **B251** [FS13] (1985) 789.
- [17] The Non-perturbative Beta-function for the SU(2) Lattice Gauge Theory;
(with S. Otto and A. Patel).
Phys. Lett. **159B** (1985) 143.
- [18] The Non-perturbative Beta-function for the SU(3) Lattice Gauge Theory;
(with G. Guralnik, A. Patel, T. Warnock and C. Zemach).
Phys. Lett. **161B** (1985) 352.
- [19] Improved Monte Carlo Renormalization Group:
Proceedings of the Tallahassee Conference on Lattice Gauge Theory, World Scientific Publishing (1985).
- [20] Solving QCD Using Monte Carlo Renormalization Group Method;
(with A. Patel),
Proceedings of APS Division of Particles and Fields Meeting; Santa Fe, New Mexico; 1984.
World Scientific Publishing (1985).
- [21] The SU(2) Deconfinement Temperature on a BCT Lattice;
(with W. Celmaster, E. Kovacs and F. Green).
Phys. Rev. **D33** (1986) 3022.
- [22] The Deconfinement Transition and MCRG;
(with G. Guralnik, A. Patel, C. Zemach and T. Warnock).
Proceedings of Conference on Quark Confinement and Liberation: University of California, Berkeley; World Scientific, 1985.
- [23] Epsilon Beyond the Naive Mass Spectrum;
(with G. Kilcup, S. Sharpe, G. Guralnik, A. Patel and T. Warnock).
Phys. Lett. **164B** (1985) 347.
- [24] Monte Carlo Renormalization Group: A Review.
Proceedings of the International Conference on Lattice Gauge Theories; Wuppertal, Germany 1985; Plenum Press 1986.
- [25] An Improved Estimate of Scalar Glueball Mass;
(with G. Guralnik, G. Kilcup, A. Patel, S. Sharpe).
Phys. Rev. Lett. **57** (1986) 1288.
- [26] Improved Actions, Redundant Operators and Scaling in Lattice SU(3);
(with A. Patel).
Phys. Lett. **183B** (1987) 193.

- [27] Weak Interaction Matrix Elements with Staggered Fermions I: Theory and a Trial Run;
(with G. Guralnik, G. Kilcup, A. Patel, and S. Sharpe).
Nucl. Phys. **B286** (1987) 253.
- [28] Clear Evidence for a First Order Chiral Transition in QCD;
(with G. Guralnik, G. Kilcup, A. Patel and S. Sharpe).
Phys. Rev. Lett. **57** (1986) 2621.
- [29] The Hadron Spectrum on a $18^3 \times 42$ lattice ;
(with G. Guralnik, G. Kilcup, A. Patel, S. Sharpe and T. Warnock).
Phys. Rev. **D36** (1987) 2813.
- [30] More on the first order chiral symmetry transition in QCD.
Proceedings of the Brookhave Conference on Lattice Gauge Theory 1986, Plenum Press 1987, and LAUR-86-4144.
- [31] $\frac{\epsilon'}{\epsilon}$ from the lattice;
(with G. Guralnik, G. Kilcup, A. Patel, S. Sharpe).
Phys. Lett. **192B** (1987) 149.
- [32] Food for Thought: Five Lectures on Lattice Gauge Theory.
Lectures at China Center of Advanced Science and Technology Symposium/Workshop on Lattice Gauge Theory Using Parallel Processors, Gordon and Breach, 1987.
- [33] Introduction to Lattice Gauge Theory.
Proceedings of the 1987 TASI in Elementary Particle Physics, Santa Fe, July 1987.
- [34] Exploring Hadron Masses in Lattice QCD with Light Quarks and an Improved Fermion Action.
(with Ph. de Forcrand, S. Güsken, K.-H. Mutter, A. Patel, K. Schilling, and R. Sommer)
Phys. Lett. **200B** (1988) 143.
- [35] On The Finite Temperature Transition in QCD.
(with G. Guralnik, G. Kilcup, A. Patel, S. Sharpe).
Phys. Lett. **201B** (1988) 503.
- [36] The Hybrid Monte Carlo algorithm and the Chiral Transition.
Proceedings of the 1987 Conference on Field Theory on the Lattice, Seillac, France, Sept. 1987, *Nucl. Phys.* **BProc. Supp.** **4** (1988) 562.
- [37] The β -function for pure gauge SU(3).
(with G. Kilcup, A. Patel and S. Sharpe)
Phys. Lett. **211B** (1988) 132.
- [38] Tuning the Hybrid Monte Carlo Algorithm.
(with G. Kilcup and S. Sharpe)
Phys. Rev. **D38** (1988) 1278.
- [39] The finite temperature transition for QCD with heavy quarks.
(with G. Kilcup and S. Sharpe)
Phys. Rev. **D38** (1988) 1288.

- [40] Comparison of update algorithms for pure gauge SU(3).
(with G. Kilcup, A. Patel, S. Sharpe and P. de Forcrand)
Mod. Phys. Lett. **A3** (1988) 1367.
- [41] An improved fermion action from block diagonalization.
(with S. Güsken, K-H. Mütter, A. Patel, R. Sommer, and K. Schilling)
Nucl. Phys. **B314** (1989) 63.
- [42] Simulating QCD with dynamical Wilson and Staggered fermions.
Proceedings of the 1988 International Symposium LATTICE'88, Fermilab, Sept. 1988,
Nucl. Phys. B (Proc. Suppl.) **9** (1989) 473.
- [43] QCD with dynamical Wilson fermions.
(with C. Baillie, G. Guralnik, G. Kilcup, A. Patel and S. Sharpe)
Phys. Rev. **D40** (1989) 2072.
- [44] Sea quarks and the hadron spectrum.
(with Apoorva Patel, Gregory W. Kilcup, Stephen R. Sharpe)
Phys. Lett. **225B** (1989) 398.
- [45] Lattice calculation of the Kaon B-parameter.
(with Gregory W. Kilcup, Apoorva Patel, Stephen R. Sharpe)
Phys. Rev. Lett. **64** (1990) 25.
- [46] QCD spectrum from the lattice.
In the proceedings of HADRON89, Ajaccio, France
Edited by F. Binon et.al., Editions Frontieres 1989, page337
- [47] The Renormalization Group and lattice QCD.
Lectures at Sixth TASI in Elementary Particle Physics, Boulder, Colorado, June 1989.
From Actions to Answers, World Scientific 1990.
- [48] Hadron spectrum from the lattice.
Plenary talk at LATTICE89, Capri, Italy
Nucl. Phys. B (Proc. Suppl.) **17** (1990) 70.
- [49] Lattice Calculation of Electroweak Amplitudes;
(with C. Bernard, R. Gupta, G. Kilcup and A. Soni)
Int. Jour. of Supercomputer Applications, Vol. 4, Number 3, p. 61
- [50] Exploring glueball wavefunctions on the lattice.
(with C. Baillie, G.W. Kilcup, Apoorva Patel, Stephen R. Sharpe)
Phys. Rev. **D43** (1991) 2301.
- [51] QCD with dynamical Wilson fermions.
In the proceedings of LATTICE90, Tallahassee, Florida
Nucl. Phys. B (Proc. Suppl.) **20** (1991) 385.
- [52] The quenched spectrum with Staggered fermions.
(with G. Guralnik, G.W. Kilcup, Stephen R. Sharpe)
Phys. Rev. **D43** (1991) 2003.

- [53] A calculation of the pion's quark distribution amplitude in lattice QCD with dynamical fermions.
(with D. Daniel and D. Richards)
Phys. Rev. **D43** (1991) 3715.
- [54] QCD with dynamical Wilson fermions II.
(with C. Baillie, R. Brickner, G. Kilcup, A. Patel and S. Sharpe)
Phys. Rev. **D44** (1991) 3272.
- [55] Lattice calculation of the $I = 2$ pion scattering length.
(with G. Kilcup and S. Sharpe)
Nucl. Phys. **B383** (1992) 309.
- [56] Phenomenology with Wilson fermions using smeared sources.
(with D. Daniel, G. Kilcup, A. Patel and S. Sharpe)
Phys. Rev. **D46** (1992) 3130.
- [57] The Kaon B parameter with Wilson fermions.
(with D. Daniel, G. Kilcup, A. Patel and S. Sharpe)
Phys. Rev. **D47** (1993) 5113.
- [58] Matrix Elements with Wilson fermions.
In the proceedings of LATTICE91, Tsukuba, Japan
Nucl. Phys. B (Proc. Suppl.) **26** (1992) 337.
- [59] Scaling, the Renormalization Group and Improved Lattice Actions.
One chapter in the book "**Quantum Fields on the Computer**", Ed. M. Creutz, World Scientific, 1992.
- [60] Meson form-factors and wave-functions with Wilson Fermions
(with D. Daniel and J. Grandy)
In the proceedings of LATTICE92, Amsterdam, The Netherlands
Nucl. Phys. B (Proc. Suppl.) **30** (1993) 419.
- [61] $I = 2$ pion scattering amplitude with Wilson Fermions.
(with A. Patel and S. Sharpe)
Phys. Rev. **D48** (1993) 388.
- [62] Bethe-Salpeter amplitudes and density correlations for mesons with Wilson fermions.
(with D. Daniel and J. Grandy)
Phys. Rev. **D48** (1993) 3330.
- [63] Calculations of hadronic matrix elements using lattice QCD.
Proceedings of 1993 Mardi Gras Conference on "High Performance Computing and its applications in the Physical Sciences", World Scientific, 1994.
- [64] Semi-leptonic form-factors of heavy-light mesons from lattice QCD.
(with T. Bhattacharya and D. Daniel)
hep-lat/9310007
Los Alamos Preprint Number LA-UR-93-3580.
- [65] A pot-pourri of results in QCD from large lattice simulations on the CM5.
(with T. Bhattacharya)
In the proceedings of LATTICE93, Dallas, Texas
Nucl. Phys. B (Proc. Suppl.) **34** (1994) 341.

- [66] Geometric measurement of topological susceptibility on large lattices.
(with J. Grandy)
In the proceedings of LATTICE93, Dallas, Texas
Nucl. Phys. B (Proc. Suppl.) **34** (1994) 164.
- [67] Matrix Elements of the Singlet Axial Current in the Proton.
(with J. Mandula)
Phys. Rev. **D50** (1994) 6931.
- [68] Semi-leptonic form-factors from lattice QCD
(with T. Bhattacharya)
Proceedings of The Albuquerque Meeting, 8th meeting of the Division of Particles and Fields of the American Physical Society.
Ed. Sally Seidel, World Scientific, 1995.
- [69] Chiral limit of QCD.
In the proceedings of LATTICE94, Bielefeld, Germany
Nucl. Phys. B (Proc. Suppl.) **42** (1995) 85.
- [70] Phenomenology from 100 large lattices
(with T. Bhattacharya)
In the proceedings of LATTICE94, Bielefeld, Germany
Nucl. Phys. B (Proc. Suppl.) **42** (1995) 935.
- [71] Topological density and Instantons on the lattice.
(with J. Grandy)
In the proceedings of LATTICE94, Bielefeld, Germany
Nucl. Phys. B (Proc. Suppl.) **42** (1995) 246.
- [72] Hadron Spectrum with Wilson Fermions
(with T. Bhattacharya, G. Kilcup, and S. Sharpe)
Phys. Rev. **D53** (1996) 6486.
- [73] Decay Constants with Wilson Fermions at $\beta = 6.0$
(with T. Bhattacharya)
Phys. Rev. **D54** (1996) 1155.
- [74] Testing the chiral behavior of the hadron spectrum.
(with T. Bhattacharya and S. Sharpe)
In the proceedings of LATTICE95, Melbourne, Australia
Nucl. Phys. B (Proc. Suppl.) **47** (1996) 549.
- [75] Lattice analysis of semi-leptonic form factors.
(with T. Bhattacharya)
In the proceedings of LATTICE95, Melbourne, Australia
Nucl. Phys. B (Proc. Suppl.) **47** (1996) 481.
- [76] Status report on weak matrix element calculations.
(with T. Bhattacharya)
In the proceedings of LATTICE95, Melbourne, Australia
Nucl. Phys. B (Proc. Suppl.) **47** (1996) 473.
- [77] Matrix elements of 4-fermion operators and B-parameters with Wilson Fermions
(with T. Bhattacharya and S. Sharpe)
Phys. Rev. **D55** (1997) 4036.

- [78] Comparison of Inversion Algorithms for Wilson Fermions on the CM5.
(with T. Bhattacharya, and G. Kilcup)
Los Alamos Preprint Number LA-UR-96-1115, hep-lat/9605029.
- [79] Light Quark Masses from Lattice QCD.
(with T. Bhattacharya)
Phys. Rev. **D55** (1997) 7203.
- [80] The Extraction of Light Quark Masses From Sum Rule Analyses of Axial and Vector Current Ward Identities
(with T. Bhattacharya and K. Maltman)
Phys. Rev. **D57** (1998) 5455.
- [81] Light quark masses and the CP violation parameter ϵ'/ϵ
(with T. Bhattacharya)
Nucl. Phys. B (Proc. Suppl.) **53** (1997) 292.
e-Print Archive: hep-lat/9609046
- [82] Staggered fermion matrix elements using smeared operators
(with G. Kilcup and S. Sharpe)
Phys. Rev. **D57** (1997) 1654.
- [83] B-parameters of 4-fermion operators from lattice QCD
Nucl. Phys. B (Proc. Suppl.) **63A-C** (1998) 278.
- [84] Advances in the determination of Quark Masses
(with T. Bhattacharya)
Nucl. Phys. B (Proc. Suppl.) **63A-C** (1998) 95.
- [85] Quark Masses, B-parameters, and CP violation parameters ϵ and ϵ'/ϵ
in *Physics of Mass* Proceedings of International Conference Orbis Scientiae 1997 II, Miami Beach, Florida, December 12–15, 1997. Edited by B. Kursunoglu, S. Mintz, A. Perlmutter, Plenum Press, 1998.
Los Alamos Preprint Number LA-UR-98-271. hep-ph/9801412.
- [86] B Meson Decay Constants From NRQCD.
(with A. Ali Khan, T. Bhattacharya, S. Collins, C. Davies, C. Morningstar, J. Shigemitsu, J. Sloan)
Phys. Lett. **427B** (1998) 132
- [87] Introduction to Lattice QCD.
Proceedings of LXVIII Les Houches Summer School *Probing the Standard Model of Particle Interactions*, July 28 - Sept 5, 1997, Eds. R. Gupta, A. Morel, E. de Rafael and F. David, North-Holland, 1999.
e-Print Archive: hep-lat/9807028
- [88] Wilson versus Clover fermions: A case for improvement
Proceedings of Lattice 98, *Nucl. Phys. B (Proc. Suppl.)* **73** (1999) 321
e-Print Archive: hep-lat/9810016.
- [89] Non-perturbative Renormalization Constants using Ward Identities
(with T. Bhattacharya, S. Chandrasekharan, W. Lee, and S. Sharpe)
Proceedings of Lattice 98, *Nucl. Phys. B (Proc. Suppl.)* **73** (1999) 276
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(with T. Bhattacharya, S. Chandrasekharan, W. Lee, S. Sharpe)
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Los Alamos Preprint Number LA-UR-99-1717
- [91] Heavy-light Mesons and Baryons with b Quarks.
(with A. Ali Khan, T. Bhattacharya, S. Collins, C. Davies, C. Morningstar, J. Shigemitsu, J. Sloan)
Phys. Rev. **D62** (2000) 054505
e-Print Archive: hep-lat/9912034
- [92] General Physics Motivations for Numerical Simulations of Quantum Field Theory
Parallel Computing **25** (1999) 1199.
e-Print Archive: hep-lat/9905027
- [93] LATTICE QCD
Core lectures at the VIII Mexican School “Particles and Fields”, Oaxaca de Juárez, November 20th – 28th 1998, Eds. J.C. DÓlivo, G.L. Castro, and M. Mondragon,
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Los Alamos Preprint Number LA-UR-99-1916
- [94] Spectrum of Mesons and Baryons with b Quarks
Proceedings of LATTICE99(heavy quarks), June 1999, Pisa, Italy
Nucl. Phys. B (Proc. Suppl.) **83-84** (2000) 295
e-Print Archive: hep-lat/9910035
- [95] Order a improved renormalization constants
(with T. Bhattacharya, W. Lee, and S. Sharpe)
Proceedings of LATTICE99(Improvement and Renormalization)
Nucl. Phys. B (Proc. Suppl.) **83-84** (2000) 851
e-Print Archive: hep-lat/9909115
- [96] Prospects of calculating ϵ_K and ϵ' from lattice QCD
To appear in the Proceedings of KAON 99
e-Print Archive: hep-lat/9908440
- [97] Fixed point pure gauge action with $b = \sqrt{3}$ RGT.
(with T. Bhattacharya, and W. Lee)
Proceedings of LATTICE99 (Improvement and Renormalization).
Nucl. Phys. B (Proc. Suppl.) **83-84** (2000) 860
e-Print Archive: hep-lat/9910046
- [98] Non-perturbative improvement of bilinears in unquenched QCD.
(with T. Bhattacharya, W. Lee, and S. Sharpe)
Proceedings of LATTICE99 (Improvement and Renormalization).
Nucl. Phys. B (Proc. Suppl.) **83-84** (2000) 902
e-Print Archive: hep-lat/9909092
- [99] Order a improved renormalization constants
(with Tanmoy Bhattacharya, Weonjong Lee, Stephen Sharpe)
Phys. Rev. **D63** (2001) 074505
e-Print Archive: hep-lat/0009038

- [100] Light quark masses: A status report at DPF 2000
(with K. Maltman)
Proceedings of DPF 2000
Int.J.Mod.Phys. **A16S1B** (2001) 591
e-Print Archive: hep-ph/0101132
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- [101] Improvement and Renormalization Constants in $O(a)$ Improved Lattice QCD
(with T. Bhattacharya, W. Lee, and S. Sharpe)
Proceedings of LATTICE 2000 (Improvement and Renormalization).
Nucl. Phys. B (Proc. Suppl.) **94** (2001) 599
e-Print Archive: hep-lat/0101007
Los Alamos Preprint Number LA-UR-00-5683
- [102] Renormalization Constants using Quark States in Fixed Gauge
(with T. Bhattacharya and W. Lee)
Proceedings of LATTICE 2000 (Improvement and Renormalization).
Nucl. Phys. B (Proc. Suppl.) **94** (2001) 595
e-Print Archive: hep-lat/0106007
- [103] Scaling behavior of improvement and renormalization constants
(with T. Bhattacharya, W. Lee, and S. Sharpe)
Proceedings of LATTICE 2001
Nucl. Phys. B (Proc. Suppl.) **106** (2002) 789
e-Print Archive: hep-lat/0111001
Los Alamos Preprint Number LA-UR-00-5861
- [104] Renormalization Constants using Quark States in Landau Gauge
(with T. Bhattacharya and W. Lee)
Proceedings of LATTICE 2001. *Nucl. Phys. B (Proc. Suppl.)* **106** (2002) 786
e-Print Archive: hep-lat/0111002
Los Alamos Preprint Number LA-UR-01-5950
- [105] Weak matrix elements for CP violation
(with T. Bhattacharya, W. Lee, and S. Sharpe)
Proceedings of LATTICE 2001. *Nucl. Phys. B (Proc. Suppl.)* **106** (2002) 311
e-Print Archive: hep-lat/0111004
Los Alamos Preprint Number LA-UR-01-5951
- [106] Progress report on the staggered epsilon'/epsilon project
(with T. Bhattacharya, G.T. Fleming, G. Kilcup, W. Lee, S. Sharpe)
Proceedings of LATTICE 2002. *Nucl. Phys. B (Proc. Suppl.)* **119** (2003) 428
e-Print Archive: hep-lat/0208050
Los Alamos Preprint Number LA-UR-01-5951
- [107] Status of B_K from Lattice QCD
Proceedings of CKM Unitarity Triangle Workshop, CERN, 2002
e-Print Archive: hep-lat/0303010
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- [108] Scaling behavior of discretization errors in renormalization and improvement constants
(with Tanmoy Bhattacharya, Weonjong Lee, Stephen Sharpe)
To be submitted to PRD
Los Alamos Preprint Number LA-UR-03-3849
- [109] Simulating a fundamental Theory of Nature
Proceedings of “The Monte Carlo Method in Physical Sciences”, Los Alamos, June 2003.
Ed. J. Gubernatis, AIP Conference Proceedings 690.
Los Alamos Preprint Number LA-UR-03-6063
- [110] Estimates of Light Quark Masses from Lattice QCD and QCD Sum rules
Proceedings of the 2nd CKM Unitarity Triangle Workshop, 5-9 April 2003, IPPP Durham,
UK (eConf C0304052).
e-Print Archive: hep-ph/0311033
Los Alamos Report Number: LAUR-03-6655
- [111] Improved bilinears in unquenched lattice QCD
(with Tanmoy Bhattacharya, Weonjong Lee, Stephen R. Sharpe, Jackson M. S. Wu)
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- [S8] Critical behavior of the 2-d XY model.
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- [S11] Critical Exponents of the 3-D Ising Model.
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- [S12] Behavior of the finite-sized, three-dimensional, Ising model near the critical point.
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- [C1] Nearest Neighbor Concurrent Processor;
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- [C2] QCD with dynamical fermions on the Connection Machine;
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- [C3] QCD on the Connection Machine.
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- [C4] Prospects of Solving Grand Challenge Problems.
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- [B1] Timing the Ancestor of the HIV-1 Pandemic Strains
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- [B2] Search for the origin of HIV and AIDS
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PUBLICATIONS AND INVITED TALKS IN PUBLIC HEALTH

See my website <http://t8web.lanl.gov/people/rajan/AIDS-india/>

- [PH1] The HIV/AIDS Pandemic in India is Real
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/summary.3.99.html>
- [PH2] Dilemmas in the care of patients with AIDS in India
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/dilemma.3.99.html>
A abridged version published in "Issues in Medical Ethics", vol VIII No. 2, April-June, 2000.
- [PH3] HIV/AIDS Poses a Threat to India: A Global Perspective
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/issues.9.99.html>
- [PH4] Health care in India in light of HIV; and the role of the West
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<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/healthINDIA.1.00.html>
- [PH5] Thoughts on whether there should be isolated or common wards for HIV+ patients
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/HIVwards.1.00.html>
- [PH6] On the HIV Beat in Bombay
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/beatbombay.2.00.html>
- [PH7] Issues of Blood Safety in India
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/blood.6.00.html>
- [PH8] We need to talk about condoms: A plea to Christian Organizations in India to break their silence
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/christian.html>
- [PH9] Risk Factors and Societal Response to HIV/AIDS in India
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/hivindia2001.html>
- [PH10] The need for a holistic approach to social intervention
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/designing.html>
- [PH11] Contagion and Stability
Participant in a simulated Health Scenario organized by the U.S. Army War College, Carlisle, Pennsylvania.
- [PH12] Response to HIV/AIDS – A Universal Policy. My thoughts on what a national policy on controlling HIV/AIDS should be.
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/hivpolicy.html>
- [PH13] BEING A GOOD ROLE MODEL". A talk to parents and teachers in India on the importance of setting a good example.
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/rolemodel.html>
- [PH14] Students as agents of change: tackling societal problems in India
Invited talk at "AIDS-in-India". Conference organized by IHO and the Harvard School of Public Health, Dec 7, 2001
- [PH15] Developing partnerships for improving health in India
Invited talk at "Health and Security". A workshop organized by CBACI, 18 June 2002, Geneva
- [PH16] Reaching kids by being a kid: HIV/AIDS intervention
Invited talk at "UNIDOS 2002" New Mexico Department of Health, Las Cruces, NM

- [PH17] Why has the number 4 million HIV+ failed to elicit the required response in India?
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/documentation.html>”
- [PH18] Five questions on HIV/AIDS in India following the National Parliamentarians Forum, July 2003
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/fivequestions.html>
- [PH19] Should commercial sex be designated sex work or prostitution in the era of HIV/AIDS?
<http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/sex-work.html>
- [PH20] Risky Sex, Addictions, and Communicable diseases in India: Implications for health, development and security
To be published as a special monogram by Chemical and Biological Arms Control Institute, Washington D.C., 2003
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PUBLICATIONS AND INVITED TALKS IN EDUCATION

- [E1] Strategic Research at Los Alamos
“Celebrating 60 years”, Los Alamos Science, Number 28, 2003.
- [E2] Education: A Key to Development: Lessons from India
Plenary talk at the International Conference *Models of Higher Education in the Arab World*, Beirut, Lebanon, 23-24 October 2003.

MAJOR REVIEW TALKS AND SUMMER SCHOOL LECTURES IN HEP

- [1] Monte Carlo Renormalization Group in Lattice Gauge Theories.
APS Spring Meeting, Baltimore, Maryland; 1985.
- [2] Monte Carlo Renormalization Group: A Review.
Plenary talk at the *International Conference on Lattice Gauge Theories*. Wuppertal, West Germany; 1985.
- [3] Open Problems in Monte Carlo Renormalization Group: Application to Critical Phenomena.
31st Annual Conference on Magnetism and Magnetic Materials, Baltimore Maryland, 1986.
- [4] Food for Thought: Five Lectures on Lattice Gauge Theories.
1st CCAST Symposium/Workshop on Lattice Gauge Theory Using Parallel Computers, Beijing, Peoples Republic of China, 1987.
- [5] Introduction to Lattice Gauge Theory.
Lectures at the Fourth TASI in Elementary Particle Physics, Santa Fe, New Mexico, July 1987.
- [6] The Renormalization Group and lattice QCD.
Lectures at Sixth TASI in Elementary Particle Physics, Boulder, Colorado, June 1989.
- [7] The finite temperature transition in QCD and the equation of state near T_c .
QUARK MATTER 88, Lennox, Massachusetts (Sept. 1988).
- [8] Status of Lattice QCD (Core lectures).
1989 U.K. Summer Institute in Theoretical Physics, Durham, U.K., August 1989.
- [9] Hadron spectrum from the lattice.
Plenary talk at *International Symposium on Lattice Field Theory, LATTICE89*, Capri, Italy, 1989
Nucl. Phys. B (Proc. Suppl.) **17** (1990) 70.
- [10] Scaling, the Renormalization Group and Improved Lattice Actions.
One chapter in the book “**Quantum Fields on the Computer**”, Ed. M. Creutz, World Scientific, 1992.
- [11] Calculations of matrix elements using lattice QCD.
Mardi Gras '93 Conference *High Performance Computing and its Applications in the Physical Sciences*, Ed Dana Browne, World Scientific 1994.
- [12] Standard Model Phenomenology from the Lattice. Six core lectures at the *XXXIV Cracow Summer School*, Zakopane, Poland, June 1994.
- [13] Chiral limit of QCD.
Plenary talk at the *International Symposium on Lattice Field Theory, LATTICE88*, Bielefeld, Germany.
Nucl. Phys. B (Proc. Suppl.) **42** (1995) 85.
- [14] The chiral behavior of quenched and unquenched QCD.
International workshop *Lattice QCD and the Structure of matter, Present and Future*, Cartona, Italy, Feb 7- 11, 1995.
- [15] Common trends in multigrid and renormalization group methods.
International conference *Multiscale Phenomena*, Eilat, Israel, Feb 20-24, 1995.

- [16] Status report on weak matrix element calculations.
International Symposium on Lattice Field Theory, LATTICE95, Melbourne, Australia.
Nucl. Phys. B (Proc. Suppl.) **47** (1996) 473.
- [17] Critical Exponents of the 3-D Ising Model.
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Int. J. Mod. Phys. 7 (1996), 305-319, cond-mat/9601048.
- [18] Quark masses from lattice QCD.
International symposium on “*Multiscale Phenomena and their simulation*”, Bielefeld, Germany, 1996.
- [19] Light quark masses.
1997 Joint April APS/AAPT meeting, Washington D.C., April, 1997.
- [20] Advances in the determination of Quark Masses
Nucl. Phys. B (Proc. Suppl.) **63A-C** (1998) 95.
Plenary talk at *International Symposium on Lattice Field Theory, LATTICE 97*, Edinburgh, U.K..
Los Alamos Preprint Number LA-UR-97-4355.
- [21] Introduction to Lattice QCD.
Core lectures at the LXVIII Les Houches Summer School *Probing the Standard Model of Particle Interactions*, July 28 - Sept 5, 1998.
Los Alamos Preprint Number LA-UR-98-3174.
e-Print Archive: hep-lat/9807028
- [22] Quark Masses, B-parameters, and CP violation parameters ϵ and ϵ'/ϵ
Review talk given at CPMASS 1997, Portugal.
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- [23] Quark Masses, B-parameters, and CP violation parameters ϵ and ϵ'/ϵ
in *Physics of Mass* Proceedings of an International Conference on Orbis Scientiae 1997 II, Miami Beach, Florida, December 12–15, 1997. Edited by B. Kursunoglu, S. Mintz, A. Perlmutter, Plenum Press, 1998.
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- [24] General Physics Motivations for Numerical Simulations of Quantum Field Theory
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- [25] Prospects of calculating ϵ_K and ϵ' from lattice QCD
Proceedings of KAON 99
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- [26] LATTICE QCD
Core lectures at the VIII Mexican School “Particles and Fields”, Oaxaca de Juárez, November 20th – 28th 1998, Eds. J.C. DÓlivo, G.L. Castro, and M. Mondragon,
AIP Conference Proceedings 490, 1999.
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- [27] “Light quark masses: A status report”, DPF 2000, The Ohio State University
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Proceedings of DPF 2000
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- [28] Status of B_K from Lattice QCD
Review at the first CKM Unitarity Triangle Workshop, CERN Geneva, 2002
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- [29] When will HPC become a mature tool to think with?
International Workshop on “*Science on Cluster Computers*”,
WE-Heraeus-Seminar, Bad Honnef, Germany, August 22 - 24, 2002.
<http://www.theorie.physik.uni-wuppertal.de/Cluster2002/talks.phtml>
Los Alamos Preprint Number LA-UR-02-6733
- [30] Light Quark Masses from Lattice QCD and QCD Sumrules
Review at the second CKM Unitarity Triangle Workshop, Durham U.K, 2003
- [31] Simulating a Fundamental Theory of Nature
Plenary Talk at “The Monte Carlo Method in Physical Sciences”, Los Alamos, June 2003
Los Alamos Preprint Number LA-UR-03-6063