

CURRICULUM VITAE

NAME	SAMIR DAYAL MATHUR
ADDRESS	Department of Physics 174 W. 18th Avenue The Ohio-State University Columbus OH 43210-1106, U.S.A.
UNIVERSITY DEGREES	M.S. Physics, I.I.T. Kanpur, India (1981) Ph.D. Physics Univ. of Bombay, India (1987)
AWARDS AND DISTINCTIONS	National Science Talent Scholarship (1976-1981) Best outgoing student, M.S. Physics (Integrated), I.I.T. Kanpur (1981) Indian National Science Academy (INSA) S.N. Bose Young Scientist Award (1984) Alumni Award for Distinguished Teaching, (Ohio State University) (2003) Society of Physics Students (Ohio State) award for Teaching (2003) Honorable mentions in Gravity Research Foundation Essay competition (2000, 2002, 2003, 2007)

RESEARCH EXPERIENCE

'81-'87, Graduate Student,
at Tata Institute of Fundamental
Research, Bombay.

'87-'89, Postdoctoral Fellow,
at Tata Institute of Fundamental
Research, Bombay.

'89-'91, Postdoctoral Fellow,
In Mathematics and Physics,
Harvard University.

'91-'97 Assistant Professor,
Massachusetts Institute of Technology.

'97-'99 Associate Professor,
Massachusetts Institute of Technology.

'99-'02 Associate Professor,
Ohio-State University.

'92- Professor,
Ohio-State University.

Research papers in refereed journals

1. “*Warps, Spiral Structure and Star Bursts caused by Perturbed Flattened Haloes in Disc Galaxies*”
Monthly Notices of Royal Astro. Soc. **211**, 901 (1984)
2. “*Possible Phenomena Arising from a Nonstationary Central Black Hole in a Galaxy*”
(with S. Shanbhag)
Astrophysical Letters **25**, 85 (1986)
3. “*Irreversibility due to Mixing in Collisionless Systems*”
Monthly Notices of Royal Astro. Soc. **231**, 367 (1988)
4. “*BRST Quantization of twisted extended fermionic strings*”
(with S. Mukhi)
Phys. Rev. D **36**, 465 (1987)
5. “*The $N=2$ fermionic string: path integral, spin structures and supermoduli on the torus*”
(with S. Mukhi)
Nucl. Phys. B **302**, 130 (1988)
6. “*Correlation functions of current algebra theories on the torus*”
(with S. Mukhi)
Phys. Lett. B **210**, 133 (1988)
7. “*Correlators of primary fields in the $SU(2)$ WZW theory on Riemann surfaces*”
(with S. Mukhi and A. Sen)
Nucl. Phys. B **305**, 219 (1988)
8. “*Differential Equations For Correlators And Characters In Arbitrary Rational Conformal Field Theories*”
(with S. Mukhi and A. Sen)
Nucl. Phys. B **312**, 15 (1989)
9. “*On the classification of rational conformal field theories*”
(with S. Mukhi and A. Sen)
Phys. Lett. B **213**, 303 (1988)
10. “*Reconstruction of conformal field theories from modular geometry on the torus*”
(with S. Mukhi and A. Sen)
Nucl. Phys. B **318**, 483 (1989)
11. “*Differential equation for genus two characters in arbitrary rational conformal field theories*”
(with A. Sen)
Phys. Lett. B **218**, 176 (1989)

12. “*Group Theoretic Classification Of Rotational Conformal Field Theories With Algebraic Characters*”
(with A. Sen)
Nucl. Phys. B **327**, 725 (1989)
13. “*Existence of Oscillation modes in Collisionless Gravitating Systems*”
Monthly Notices of Royal Astro. Soc. **243**, 529 (1990)
14. “*Integrable deformations and scattering matrices for the $N=2$ supersymmetric discrete series*”
(with P. Fendley, C. Vafa and N. P. Warner)
Phys. Lett. B **243**, 257 (1990)
15. “ *$N=2$ Supersymmetric Integrable Models From Affine Toda Theories*”
(with P. Fendley, W. Lerche and N. P. Warner)
Nucl. Phys. B **348**, 66 (1991)
16. “*Irreducible Integrable Theories From Tensor Products Of Conformal Models*”
(with N. P. Warner)
Phys. Lett. B **254**, 365 (1991)
17. “*Quantum Kac-Moody symmetry in integrable field theories*”
Nucl. Phys. B **369**, 433 (1992)
18. “*Onset of linear instability in homogeneous plasmas*”
J. Phys. A: Math. Gen. **25** No 15 4083 (1992)
19. “*World Sheet Geometry And Baby Universes In 2-D Quantum Gravity*”
(with S. Jain)
Phys. Lett. B **286**, 239 (1992) [arXiv:hep-th/9204017]
20. “*Eluding The No Hair Conjecture: Black Holes In Spontaneously Broken Gauge Theories*”
(with B. R. Greene and C. M. O’Neill)
Phys. Rev. D **47**, 2242 (1993) [arXiv:hep-th/9211007]
21. “*Evaporating black holes and entropy*”
(with E. Keski-Vakkuri)
Phys. Rev. D **50**, 917 (1994) [arXiv:hep-th/9312194]
22. “*Breakdown of the semiclassical approximation at the black hole horizon*”
(with E. Keski-Vakkuri, G. Lifschytz and M. E. Ortiz)
Phys. Rev. D **51**, 1764 (1995) [arXiv:hep-th/9408039]
23. “*A Note on the semiclassical approximation in quantum gravity*”
(with G. Lifschytz and M. Ortiz)
Phys. Rev. D **53**, 766 (1996) [arXiv:gr-qc/9412040]

24. “*Folds, bosonization and nontriviality of the classical limit of 2-D string theory*”
(with S. R. Das)
Phys. Lett. B **365**, 79 (1996) [arXiv:hep-th/9507141]
25. “*Excitations of D-strings, Entropy and Duality*”
(with S. R. Das)
Phys. Lett. B **375**, 103 (1996) [arXiv:hep-th/9601152]
26. “*Quantum Gravity and Turning Points in the Semiclassical Approximation*”
(with E. Keski-Vakkuri)
Phys. Rev. D **54**, 7391 (1996) [arXiv:gr-qc/9604058]
27. “*Comparing decay rates for black holes and D-branes*”
(with S. R. Das)
Nucl. Phys. B **478**, 561 (1996) [arXiv:hep-th/9606185]
28. “*Interactions involving D-branes*”
(with S. R. Das)
Nucl. Phys. B **482**, 153 (1996) [arXiv:hep-th/9607149]
29. “*Universality of low energy absorption cross sections for black holes*”
(with S. R. Das and G. W. Gibbons)
Phys. Rev. Lett. **78**, 417 (1997) [arXiv:hep-th/9609052]
30. “*Supersymmetry and membrane interactions in M(atrix) theory*”
(with G. Lifschytz)
Nucl. Phys. B **507**, 621 (1997) [arXiv:hep-th/9612087]
31. “*Black hole greybody factors and absorption of scalars by effective strings*”
(with I. R. Klebanov)
Nucl. Phys. B **500**, 115 (1997) [arXiv:hep-th/9701187]
32. “*Absorption of angular momentum by black holes and D-branes*”
Nucl. Phys. B **514**, 204 (1998) [arXiv:hep-th/9704156]
33. “*Emission rates, the correspondence principle and the information paradox*”
Nucl. Phys. B **529**, 295 (1998) [arXiv:hep-th/9706151]
34. “*Boosts, Schwarzschild black holes and absorption cross-sections in M theory*”
(with S. R. Das, S. Kalyana Rama and P. Ramadevi)
Nucl. Phys. B **527**, 187 (1998) [arXiv:hep-th/9711003]
35. “*Hawking radiation from four-dimensional Schwarzschild black holes in M-theory*”
(with S. R. Das and P. Ramadevi)
Phys. Rev. D **59**, 084001 (1999) [arXiv:hep-th/9803078]
36. “*Correlation functions in the CFT(d)/AdS(d + 1) correspondence*”
(with D. Z. Freedman, A. Matusis and L. Rastelli)
Nucl. Phys. B **546**, 96 (1999) [arXiv:hep-th/9804058]

37. “*Comments on 4-point functions in the CFT/AdS correspondence*”
(with D. Z. Freedman, A. Matusis and L. Rastelli)
Phys. Lett. B **452**, 61 (1999) [arXiv:hep-th/9808006]
38. “*Graviton and gauge boson propagators in AdS(d+1)*”
(with E. D’Hoker, D. Z. Freedman, A. Matusis and L. Rastelli)
Nucl. Phys. B **562**, 330 (1999) [arXiv:hep-th/9902042]
39. “*Graviton exchange and complete 4-point functions in the AdS/CFT correspondence*”
(with E. D’Hoker, D. Z. Freedman, A. Matusis and L. Rastelli)
Nucl. Phys. B **562**, 353 (1999) [arXiv:hep-th/9903196]
40. “*Discrete spectrum of the graviton in the AdS(5) black hole background*”
(with R. C. Brower and C. I. Tan)
Nucl. Phys. B **574**, 219 (2000) [arXiv:hep-th/9908196]
41. “*The operator product expansion of N = 4 SYM and the 4-point functions of supergravity*”
(with E. D’Hoker, A. Matusis and L. Rastelli)
Nucl. Phys. B **589**, 38 (2000) [arXiv:hep-th/9911222]
42. “*Glueball spectrum for QCD from AdS supergravity duality*”
(with R. C. Brower and C. I. Tan)
Nucl. Phys. B **587**, 249 (2000) [arXiv:hep-th/0003115]
43. “*Correlation functions for M(N)/S(N) orbifolds*”
(with O. Lunin)
Commun. Math. Phys. **219**, 399 (2001) [arXiv:hep-th/0006196]
44. “*Resolving the black hole information paradox*”
Int. J. Mod. Phys. A **15**, 4877 (2000) [arXiv:gr-qc/0007011]
45. “*Giant gravitons, BPS bounds and noncommutativity*”
(with S. R. Das and A. Jevicki)
Phys. Rev. D **63**, 044001 (2001) [arXiv:hep-th/0008088]
46. “*Vibration modes of giant gravitons*”
(with S. R. Das and A. Jevicki)
Phys. Rev. D **63**, 024013 (2001) [arXiv:hep-th/0009019]
47. “*Three-point functions for M(N)/S(N) orbifolds with N = 4 supersymmetry*”
(with O. Lunin)
Commun. Math. Phys. **227**, 385 (2002) [arXiv:hep-th/0103169]
48. “*Metric of the multiply wound rotating string*”
(with O. Lunin)
Nucl. Phys. B **610**, 49 (2001) [arXiv:hep-th/0105136]

49. “*The slowly rotating near extremal D1-D5 system as a ‘hot tube’*”
(with O. Lunin)
Nucl. Phys. B **615**, 285 (2001) [arXiv:hep-th/0107113]
50. “*AdS/CFT duality and the black hole information paradox*”
(with O. Lunin)
Nucl. Phys. B **623**, 342 (2002) [arXiv:hep-th/0109154]
51. “*Statistical interpretation of Bekenstein entropy for systems with a stretched horizon*”
(with O. Lunin)
Phys. Rev. Lett. **88**, 211303 (2002) [arXiv:hep-th/0202072]
52. “*Scalar propagator in the pp-wave geometry obtained from AdS(5) x S(5)*”
(with A. Saxena and Y. K. Srivastava)
Nucl. Phys. B **640**, 367 (2002) [arXiv:hep-th/0205136]
53. “*A proposal to resolve the black hole information paradox*”
Int. J. Mod. Phys. D **11**, 1537 (2002) [arXiv:hep-th/0205192]
54. “*Rotating deformations of AdS(3) x S(3), the orbifold CFT and strings in the pp-wave limit*”
(with O. Lunin)
Nucl. Phys. B **642**, 91 (2002) [arXiv:hep-th/0206107]
55. “*Brane world gravity in an AdS black hole*”
(with R. C. Brower and C. I. Tan)
Nucl. Phys. B **661**, 344 (2003) [arXiv:hep-th/0210285]
56. “*What is the gravity dual of a chiral primary?*”
(with O. Lunin and A. Saxena)
Nucl. Phys. B **655**, 185 (2003) [arXiv:hep-th/0211292]
57. “*Tachyon condensation and ‘bounce’ in the D1-D5 system*”
(with O. Lunin, I. Y. Park and A. Saxena)
Nucl. Phys. B **679**, 299 (2004) [arXiv:hep-th/0304007]
58. “*How does the universe expand?*”
Int. J. Mod. Phys. D **12**, 1681 (2003) [arXiv:hep-th/0305204]
59. “*Constructing ‘hair’ for the three charge hole*”
(with A. Saxena and Y. K. Srivastava)
Nucl. Phys. B **680**, 415 (2004) [arXiv:hep-th/0311092]
60. “*Dual geometries for a set of 3-charge microstates*”
(with S. Giusto and A. Saxena)
Nucl. Phys. B **701**, 357 (2004) [arXiv:hep-th/0405017]
61. “*3-charge geometries and their CFT duals*”
(with S. Giusto and A. Saxena)
Nucl. Phys. B **710**, 425 (2005) [arXiv:hep-th/0406103]

62. “*Geometry of D1-D5-P bound states*”
(with S. Giusto)
Nucl. Phys. B **729**, 203 (2005) [arXiv:hep-th/0409067]
63. “*Fuzzball geometries and higher derivative corrections for extremal holes*”
(with S. Giusto)
Nucl. Phys. B **738**, 48 (2006) [arXiv:hep-th/0412133]
64. “*Branes wrapping black holes*”
(with S. R. Das, S. Giusto Y. Srivastava, X. Wu and C. Zhou)
Nucl. Phys. B **733**, 297 (2006) [arXiv:hep-th/0507080]
65. “*Dynamics of supertubes*”
(with S. Giusto and Y. K. Srivastava)
Nucl. Phys. B **754**, 233 (2006) [arXiv:hep-th/0510235]
66. “*A microstate for the 3-charge black ring*”
(with S. Giusto and Y. K. Srivastava)
Nucl. Phys. B **763**, 60 (2007) [arXiv:hep-th/0601193]
67. “*A microscopic model for the black hole - black string phase transition*”
(with B. D. Chowdhury and S. Giusto)
Nucl. Phys. B **762**, 301 (2007) [arXiv:hep-th/0610069]
68. “*Fractional brane state in the early universe*”
(with B. D. Chowdhury)
Class. Quant. Grav. **24**, 2689 (2007) [arXiv:hep-th/0611330]
69. “*Radiation from the non-extremal fuzzball*”
(with B. D. Chowdhury)
Class. Quant. Grav. **25**, 135005 (2008) [arXiv:0711.4817 [hep-th]]
70. “*Pair creation in non-extremal fuzzball geometries*”
(with B. D. Chowdhury)
Class. Quant. Grav. **25**, 225021 (2008) [arXiv:0806.2309 [hep-th]]
71. “*Non-extremal fuzzballs and ergoregion emission*”
(with B. D. Chowdhury)
Class. Quant. Grav. **26**, 035006 (2009) [arXiv:0810.2951 [hep-th]]

Preprints

1. “*Falling into a black hole*”
arXiv:0705.3828 [hep-th]
2. “*Black hole size and phase space volumes*”
arXiv:0706.3884 [hep-th]

3. “*Tunneling into fuzzball states*”
arXiv:0805.3716 [hep-th]

Papers in Special Volumes:

1. “*The black hole information paradox: What have we learnt from string theory?*” in *The Universe* (2000) ed. A. Kembhavi and N. Dadich, (Kluwer Academic).
2. “*Extremal Correlators in the AdS/CFT Correspondence*” (with E. d’Hoker, D. Freedman, A. Matusis and L. Rastelli) in *Many faces of the Superworld* (2000) ed. M. Shifman (World Scientific).
3. “*Fuzzballs and the information paradox: a summary and conjectures*”
S. D. Mathur
arXiv:0810.4525 [hep-th] (To appear in ‘Quantum gravity, Cosmology and Black Holes’, special volume of *Advanced Science Letters*)

Review articles:

1. “*D-branes and Black Holes*” (with S. Das): *Annual Reviews of Nuclear and Particle Science*, **50** (2000) 153.
2. “*The fuzzball proposal for black holes: An elementary review*”, Proceedings of the RTN Workshop at Crete, July 2004; Fortsch. Phys. **53**, 793 (2005).
3. “*The quantum structure of black holes*”
Class. Quant. Grav. **23**, R115 (2006) [arXiv:hep-th/0510180]

Other research papers

1. “*Kinetic Theory In Curved Space: A First Quantized Approach*”
arXiv:hep-th/9301044
PRINT-93-0114 (MIT)(1993)
Preprint - Mathur, S.D. (93/01,rec.Jan.) 22 p.B e: LANL hep-th/9301044
2. “*Is the Polyakov path integral prescription too restrictive?*”
arXiv:hep-th/9306090
PRINT-93-0517 (MIT)(1993)
3. “*Information Retrieval From A Charge ‘Trap’*”
arXiv:hep-th/9308069
PRINT-93-0613 (MIT)(1993)

4. “*Absorption of partial waves by three-branes*”
(with A. Matusis)
arXiv:hep-th/9805064
MIT-CTP-2739(1998)
5. “*Gravity on $AdS(3)$ and flat connections in the boundary CFT*”
arXiv:hep-th/0101118
OHSTPY-HEP-T-00-033(2001)

Conference proceedings

1. “*Small Oscillations of Collisionless Gravitating Systems*” in “Space Dynamics and Celestial Mechanics”, (K.B. Bhatnagar ed.) D. Reidel, pg 221.
2. “*Non-Abelian Currents on Riemann Surfaces*” in ‘DST Workshop on Particle Physics-Superstring Theory’, (H.S. Mani and R.Ramachandran, ed.) pg 528.
3. “*Real time propagator in the first quantised formalism*” in ‘Banff/Cap workshop on Thermal Field Theory, ed Khanna et.al, (World Scientific 1994), pg. 374.
4. “*Black Hole Entropy and the Semiclassical Approximation*” in ‘Modern quantum field theory II’ , ed. Das et. al (World Scientific 1995), pg. 13.
5. “*Quantum Gravity issues in Black Hole Evaporation*” in ‘Proceedings of the International Workshop on Planck Scale Physics’, Puri 1994, ed. Maharana, J. (World Scientific).
6. “*Non-BPS excitations of D-branes and black holes*” Strings 96, Santa Barbara, Jul 1996, arXiv:hep-th/9609053.
7. “*The AdS/CFT correspondence*”, in ‘Proceedings of XXXIVth Rencontres de Moriond - QCD and High Energy Hadronic Interactions March 1999, Les Arcs, France’.
8. “The relation between gauge theories and gravity”, in ‘Providence 1999, QCD and multiparticle production’, p 478.
9. “*Correlation functions for orbifolds of type M^N/S^N* ”, (with O. Lunin), in ‘Mirror Symmetry IV, Strings, duality and geometry’, Montreal, March 2000, ed. Dhoker et. al. (American Mathematical Society) pg. 311.
10. “*A comment on the black hole information paradox*”, in the proceedings of the DPF meeting, Columbus, August 2000; Int. Journal of Mod. Phys., **A16S1C** (2001) 1001.
11. “*Correlations functions for orbifolds of the symmetric group*”, Proceedings of ‘30 Years of supersymmetry’, Nucl. Phys. B Proc. Suppl. **101** (2001) pg. 296.
12. “*Where are the states of a black hole?*”, ‘Quantum theories and Symmetries’, ed. Argyres et. al., pg. 152 (World Scientific 2004).

13. “*What is inside a black hole?*”, Proceedings of ‘Strings 2004’, Comptes Rendus Physique, Vol. 6, No. 2 (2005) pg 243.
14. “*What is the state of the Early Universe?*”
J. Phys. Conf. Ser. **140**, 012009 (2008) [arXiv:0803.3727 [hep-th]]
Proceedings of 6th International Conference on Gravitation and Cosmology (ICGC-2007), Ganeshkhind, Pune, India, 17-21 Dec 2007
15. “*What Exactly is the Information Paradox?*”
Lect. Notes Phys. **769**, 3 (2009) [arXiv:0803.2030 [hep-th]]
Proceedings of 4th Aegean Summer School: Black Holes, Mytilene, Island of Lesvos, Greece, 17-22 Sep 2007

Talks at Conferences and Workshops

1. “*Flattening of Galactic Rotation Curves due to presence of C-field*”, Winter School in Advanced Celestial Mechanics, Hyderabad, India (1983)
2. “*A New Model for Warps and Spirals*”, Cambridge Society-TIFR International Workshop on Galaxy Interactions, Bombay (India) (1983)
3. “*Small Oscillations of Collisionless Gravitating Systems*”, Univ. of Delhi (1985).
4. “*Small Oscillations of Collisionless Gravitating Systems*”, Brief Report presented at IAU General Assembly, 1985, New Delhi (India).
5. “*Non-Abelian Currents on Riemann Surfaces*”, DST Workshop on Particle Physics-Superstring Theory, I.I.T. Kanpur, December 1987.
6. “*Classification of Rational Conformal Field Theories*”, Landau Birthday Symposium, June 1988, Copenhagen (Denmark).
7. “*Real time propagator in the first quantised formalism*”, Summer workshop at Banff, Canada (1993)
8. “*Black Hole Entropy and the Semiclassical Approximation*” Invited talk at the International Colloquium on modern quantum field theory II at TIFR (Bombay) January 1994.
9. “*Quantum Gravity issues in Black Hole Evaporation*” Invited talk at “*Beyond the Planck Scale*”, Puri (India), December 1994.
10. “*Non-BPS excitations of D-branes and Black holes*”, Strings ’96’, Santa Barbara (USA), July 1996.
11. “*Black holes, Phase transitions and the Information Paradox*”, Aspen, July 1997.
12. “*Microscopic model of Hawking Radiation*”, Invited talk given at PASCOS ’98 (North Eastern University, Boston).
13. “*Absorption by D3-branes*”, Invited talk given at Strings ’98 (Santa Barbara).
14. “*Lessons from string models about black hole absorption*”, Invited talk at Spinoza meeting on black holes, July ’98, Utrecht (Holland).
15. “*Overview of M-theory and Black Holes*”, Invited talk at the Santa Fe workshop ‘Beyond the Standard Model’, August ’98.
16. “*Black Holes, Strings and the Information Paradox*”, Invited talk at ‘Nonperturbative Particle Dynamics’, Aspen, January ’99.
17. “*The AdS/CFT correspondence*”, Invited talk at ‘Rencontres du Moriond’, France, March ’99.

18. *"The relation between gauge theories and gravity"*, Invited talk at 'International Symposium on Multiparticle Dynamics', Brown University, August '99.
19. *"Correlation functions for orbifolds of the symmetric group"*, Invited talk at 'Strings, duality and geometry', Montreal, March 2000.
20. *"Correlations functions for orbifolds of the symmetric group"*, Invited talk at the String workshop at KIAS, Seoul, June 2000.
21. *"A comment on the black hole information paradox"*, DPF meeting, Columbus, August 2000.
22. *"Correlations functions for orbifolds of the symmetric group"*, '30 Years of supersymmetry', University of Minnesota, October 2000.
23. *"What is the Gravity dual of a chiral primary?"*, Invited talk at APS meeting, Ohio State University, October 2002.
24. *"String theory and the black hole information paradox"*, Invited survey talk at Workshop on String Theory, Allahabad (India), December 2002.
25. *"Where are the states of a black hole?"* Invited talk at 'The Provocative Universe', Pune (India) June 2003.
26. *"String theory and the black hole information paradox"* Invited talk at the Aspen workshop, August 2003.
27. *"What is inside a black hole?"* 'Quantum theory and symmetries', Cincinnati, Sep. 2003.
28. *"The quantum structure of black holes"*, Invited talk at 'Strings 2004', Paris, June 2004.
29. *"The black hole interior"*, 'Quantum Structure of Black holes', Ohio State, Sep 2004.
30. *"The fuzzball proposal for black holes: An elementary review"*, Invited talk at RTN Workshop at Crete, July 2004.
31. *"The quantum structure of black holes"*, Invited talk at the IPAM reunion conference, Lake Arrowhead, Dec 2004.
32. *"What is inside a black hole"*, Invited plenary talk at the annual meeting of the Finnish Physical Society, March '05.
33. *"Dynamics of Supertubes"*, Invited talk at workshop on Higher Dimensional General relativity', KITP, Santa Barbara, Feb 2006.
34. *"Dynamics of Supertubes"*, Invited talk at 'Black holes, black rings and topological strings', Munich (Germany) April 2006.
35. *"The quantum structure of black holes"*, Invited talk at 'EuroStrings 2006', Cambridge (UK) April 2006.

36. *“Microscopics of the Black hole – Black string phase transition”*, Invited talk at ‘Strings 2006’, Beijing (China), June 2006.
37. *“Strings and Black Holes”*, Invited talk at ‘PASCOS 2006’, Ohio State, September 2006.
38. *“String theory at high density”*, Invited talk at ‘ISM06’, Puri (India) , December 2006.
39. *“How fuzzballs resolve the black hole information paradox”*, Invited talk at ‘Workshop on gravitation, Cosmos and the Quantum’, Penn State, May 2007.
40. *“How fuzzballs resolve the black hole information paradox”*, Invited talk at ‘Black Holes VI’, White Point (Nova Scotia), Canada, May 2007.
41. *“The fuzzball proposal for the black hole interior”* , Invited talk at ‘37th Paris Summer Institute on Black holes, Black rings and Modular forms’, August 2007.
42. *“What is the state of the early Universe”*, Invited talk at ‘International Conference on Gravitation and Cosmology - 07’, Pune, Dec 2007.
43. *“The quantum structure of the black hole interior”*, talk at Great Lakes String Conference, April 2008, University of Wisconsin.
44. *“How information emerges from the black hole”*, Invited talk at the ‘Topical workshop on black holes in fundamental physics’, Penn State, May 2008.
45. *“The Fuzzball nature of black holes”*, Invited talk at workshop on ‘Information loss in black holes’, May 2008, Paris, France.
46. *“The quantum structure of black holes”*, Invited talk at ‘Gravitational Thermodynamics and the quantum nature of spacetime’, June 2008, Edinburgh, Scotland.
47. *“The quantum structure of black holes”*, Invited talk at “Strings at Amsterdam”, July 2008, Amsterdam, The Netherlands.
48. *“What is the black hole information paradox?”*, Invited overview talk at ‘Black holes in general relativity and string theory’, September 2008, Veli Losinj (Croatia)
49. *“The fuzzball structure of black holes”*, Invited overview talk at ‘Black holes in general relativity and string theory’, September 2008, Veli Losinj (Croatia)
50. *“Lessons from the information paradox”*, Talk at SPOCK meeting, University of Cincinnati, November 2008.
51. *“The fuzzball proposal for black holes”*, Invited talk at ‘Indian Strings Meeting’, December 2008, Pondicherry, India.
52. *“An overview of Quantum Gravity, Strings and Black Holes”*, Invited Lecture at Refresher Course, December 2008, University of Delhi, India.
53. *“How string theory resolves the Black Hole Information Paradox”*, Invited talk at ‘Black Holes and Quantum Physics’, Perimeter Institute (Canada) Jan 2009.

54. "*Resolving the black hole information paradox*", Invited talk at 'Tests of Gravity and Gravitational Physics', Case Western, May 2009.

Colloquia

1. "*Black holes, String theory and the Information Paradox*", September 1997, M.I.T.
2. "*Black holes, String theory and the Information Paradox*", February 1998, Case Western.
3. "*The Black Hole Information Problem: What have we learnt from Strings?*", February 1999, University of Arizona, Tucson.
4. "*The Black Hole Information Problem: What have we learnt from Strings?*", March 1999, Ohio-State University, Columbus.
5. "*What is inside a black hole*", November 2004, Ohio State
6. "*What is inside a black hole*", January 2005, Univ. of Chicago.
7. "*What is inside a black hole*", October '05, UC Davis.
8. "*What is inside a black hole*", January 2006, Penn State.
9. "*What is inside a black hole*", January 2006, Carnegie-Mellon Univ.
10. "*What is inside a black hole*", March 2006, University of Cincinnati.
11. "*How string theory resolves the black hole information paradox*", April 2008, McGill University, Canada.
12. "*What is inside a black hole*", September 2008, Virginia Tech.
13. "*What is inside a black hole*", February 2009, Brown University.

Summer School Lectures

1. *TASI 2005 Summer School*, Colorado, June '05 (4 lectures)
2. '*Strings, Gravity and Cosmology*', summer school at the Perimeter Institute, Waterloo (Canada) July '05 (3 lectures).
3. *Summer School on Strings*, National Taiwan University July '05 (3 lectures)
4. *4th Aegean School on Black Holes*, Mytilene, Greece, September '07 (2 lectures)
5. *CERN winter school on supergravity, strings and gauge theories*, Feb '09 (4 lectures)

Outreach talks

1. “*Black holes and string theory*”, invited talk to school and college teachers of Ohio at AAPT meeting, November 2004.
2. “*What is inside a black hole?*”, invited talk to the Rotary Club of Columbus, November 2004.
3. “*String theory, black holes and the information paradox*”, invited talk at the annual winter physics celebrations at Ohio Wesleyan University, January 2005.

Ph.D Thesis

“*Dynamics of Collisionless Gravitating Systems*”, University of Bombay (1987), 178 pages.

Book Chapter

“*Teaching and the Pursuit of Clarity*”, in ‘Secrets of Good Teaching’, ed. Viney Kirpal, Icfai Univ. Press 2006, pg. 101.

Organization of Conferences and workshops

1. Member, Local Organizing Committee, DPF meeting, August 2000, at Ohio State.
2. Chair, Scientific Organizing Committee, “Quantum Physics of Black Holes”, conference at Ohio State, September 2004.
3. Co-organizer of Aspen Summer Workshop ‘Recent progress in black holes in string theory’, August 2006.
4. Member, Local Organizing Committee, PASCOS, September 2006, at Ohio State.