BRIEF CURRICULUM VITAE, LIST OF PUBLICATIONS

Name: Sayan Kar **Gender**: Male **Nationality**: Indian

Date and Place of Birth: 22 . 12. 1965, Calcutta, India.

Present Occupation

Professor at the Department of Physics, IIT Kharagpur, WB, India.

Associated with the Centre for Theoretical Studies, IIT Kharagpur, WB, India since 1998.

Address for Correspondence

Department of Physics

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Areas of Research Interest

(i) General Relativity, Modified Gravity theories (including physics of gravitational waves.)

(ii) Strings and branes in flat and curved spacetimes.

(iii) Ricci and other geometric flows.

(iv) Quantum mechanics: tunnelling, instantons, bounces, exact solutions.

(v) Classical mechanics, waves and optics (pedagogy, physics education).

Post Doctoral Experience

Post Doctoral Fellow at IOP, Bhubaneswar, India between Nov. 1, 1994 and Aug. 2, 1996.

Post Doctoral Fellow at IUCAA, Pune, India between Sept. 4, 1996 and Jul. 10, 1998.

Educational Qualifications

Ph. d. (Indian Institute of Technology, Kanpur) (1994).

Thesis title : Geometry, Matter and Wave Propagation in Lorentzian Wormhole Spacetimes.

Thesis Advisor : Dr. Deshdeep Sahdev

M. Sc. (Indian Institute of Technology, Kanpur) (1990).

B. Sc.(Hons), (Visva Bharati, Santiniketan) (1987).

School education: Calcutta Boys' School, Kolkata; Patha Bhavana and Uttar Sikhsha Sadana, Santiniketan.

Teaching/Project supervision/Phd supervision

- Courses taught at IIT Kharagpur:

Theory courses

(1) Physics I, Physics of waves (1st yr B. Tech/B.S/M.Sc.)

(2) Physics II (2nd yr B. Tech/M.Sc.).

(3) Classical Mechanics II (3rd yr MSc, 1st yr MSc2yr)

(4) Electrodynamics II (3rd yr MSc, 1st yr MSc2yr)

(5) Quantum Mechanics I (3rd yr MSc, 1st yr Msc2yr)

(6) Mathematical Methods (old curriculum 4th Yr M.Sc., 1st yr MSc2yr)

(7) Mechanics and Special Relativity (old curriculum 3rd yr M.Sc.)

(8) Mathematical Methods II (3rd yr MSc, 1st yr MSc2yr)

(8) Gravitation and Cosmology (old curriculum 5th yr Elective)

(9) Introduction to Field Theory (old curriculum 5th yr Elective)

(10) Physical Cosmology (4th/5th yr M.Sc., MSc2yr 2nd yr; shared)

(11) Advanced topics in field theory and gravitation (4th/5th yr. M.Sc., MSc 2yr 2ndyr)

(12) General Relativity (4th/5th yr M.Sc., 2nd yr MSc 2yr)

(13) Neutrino Physics (4th/5th yr M.Sc.; shared)

(14) Quantum Field Theory I (4th/5th yr MSc, 2nd yr MSc 2yr)

(15) Mathematical Methods I (3rd yr MSc, 1st yr 2 yr MSc)

(16) Advanced Mathematical Techniques (Phd, CTS course, shared)

Tutorials

(1) Physics I (1st yr B. Tech.)

(2) Dynamics (2nd yr B. Tech, Mech. Engg. course)

(3) Physics II (2nd yr B. Tech)

(4) Solid State Physics (2nd yr B. Tech, ECE Dept. course, old curriculum)

Laboratory courses

(1) B. Tech 1st yr Lab, 2nd yr Physics Labs,

(2) M.Sc. 3rd yr, 4th yr Physics Labs.

- Courses taught in the IUCAA–NCRA Graduate School:

  (1) General Relativity, 2nd Semester, 1996-97, (2) Mathematical Methods, 1st Semester, 1997-98

- Supervised a student from Department of Physics, University of Pune, Pune(M. Sc. 2nd Yr,) on a M. Sc. Project titled *Introduction to Solitons and Instantons* between January to April 1997.

- **Supervised students from IIT Kharagpur** (MSc, BTech. final year) on M.Sc./BTech Projects titled:

  (1) *Two dimensional models of gravity, Aparup Banerjee* between September 1998-April 1999.

  (2) *Geometry in coupling space, Birjoo D. Vaishnav* between September 1999 and April 2000

  (3) *Nonfactorisable spacetimes: geometric aspects, Piyush Kumar* between August 2000 to April 2001

  (4) *Instantons and bounces in quantum mechanics, Anupam Das* between August 2000 and April 2001

  (5) *Geometry and physics of membranes, Amit P. S. Yadav* between August 2001 and April 2002

  (6) *Spacetime inside the halo of a spiral galaxy, Modhurita Mitra* between August 2001 and April 2002

  (7) *Physics and geometry in braneworld models, Bindusar Sahoo* between August 2002 and April 2003

  (8) *Information geometry in statistical mechanical models, Kaushik Mitra* between August 2003 and April 2004

(9) *Axionic Electrodynamics*, *Phoolchand Mahato* between August 2004 and April 2005

(10) *Some aspects of* $2+1$ *gravity*, *Sanjit Das* betweeen August 2004 and April 2005

(11) *Some aspects of braneworld models and extra dimensions*, *Ritwik Mukherjee* between August 2004 and April 2005

(12) *Accelerated universe models with scalar fields*, *Sandipan Sengupta* between August 2005 and April 2006

(13) *Spherically symmetric geometries in Einstein gravity coupled to scalar fields*, *Dharmesh Jain* between August 2006 and April 2007

(14) *Extra dimensional spacetimes without and with the radion*, *Debraj Roy* between August 2006 and April 2007

(15) *Caustics and critical curves in optics and gravitational lensing*, *Dibyendu Mandal* between August 2007 to April 2008

(16) *Unusual bound states in quantum mechanics*, *Anirban Ghosh* between August 2007 to April 2008

(17) *Kinematics of deformable media*, *Anirban Gangopadhyay* between August 2007 to April 2008

(18) *Quantum mechanical potential problems: new method and applications*, *Wrick Sengupta* between August 2008 to April 2009

(19) *Kinematics of geodesic flows in curved spacetimes*, *Abhishek Choudhury* between August 2008 to April 2009

(20) *Ricci flow of warped product manifolds*, *Kartik Prabhu* between August 2009 to April 2010

(21) *Classical strings in various curved backgrounds*, *Chandrachur Chakraborty* between August 2009 to April 2010

(22) *Eddington's determinantal gravity: a recent modified version and solutions*, *Siddharth Prabhu* between August 2010 to April 2011

(23) *Quantum mechanics of potentials unbounded below*, *Trisha Nath* between August 2010 to April 2011

(24) *Asymptotic iteration method for eigenvalue problems: new examples , Rajibul Shaikh* between August 2011 to April 2012

(25) *Stability of soap films between rings, Soumya Jana* between August 2011 to April 2012

(26) *Parallel transport and holonomy in warped spacetimes, Anton Joe* between August 2011 to April 2012

(27) *Astrophysics in Eddington-inspired Born-Infeld gravity , Sudeshna Saha* between August 2012 to April 2013

(28) *Cosmology in Eddington-inspired Born-Infeld gravity, Sayantani Bera* between August 2012 to April 2013

(29) *Bulk gauge fields in warped braneworld models, Nabhanila Nandi* between August 2012 to April 2013

(30) *Gravitational lensing in wormhole spacetimes, Arpita Saha* between August 2012 to April 2013

(31) *Quantum mechanical bound states in the continuum, Pallabi Das* between August 2013 and April 2014

(32) *A modified Newtonian gravity and its applications, Siddhartha Gupta* between August 2013 and April 2014

(33) *Soap films in electric fields, Snehasish Nandy* between August 2013 and April 2014

(34) *Indentation of shell structures with various geometries, Sandeep Kataria* between August 2013 and April 2014

(35) *Kinematics of trajectories in classical mechanics, Avik Banerjee* between August 2014 and April 2015

(36) *Aspects of bound states in the continuum, Urmimala Dey* between August 2014 and April 2015

(37) *Fermions in slanted warped extra dimensions, Sandeep Kumar Acharya* between August 2014 and April 2015

(38) *General Relativity coupled to a scalar field: some results, Koushik Chatterjee* between August 2015 and April 2016

(39) *Black body radiation in higher dimensions, Krishnendu Samanta*, between August 2015 and April 2016

(40) *Black flower spacetimes, Poulami DuttaRoy*, between August 2016 and April 2017

(41) , *Nonrelativistic quantum mechanics in curved spaces, Suman Karan*, between August 2016 and April 2017

(42) *Topics on the square well potential in quantum mechanics, Swadhiti Maji*, between August 2017 and April 2018

(43) *Quasinormal modes in diverse systems, Sayan K. Das*, between August 2017 and April 2018

(44) *Classical and quantum mechanics of a particle on a rotating ring, Apoorva Sinha (EE Dept., Dual degree, BTP+M. Tech project)*, between August 2016 and April 2018

(45) *Quasinormal modes: some examples in different systems, Jagannath Das*, between August 2018 and April 2019

(46) *Quasinormal modes in Damour-Solodukhin spacetimes, Suvrat Rao*, between August 2018 and April 2019

(47) *The gravitational wave memory effect, Aratrika Dey*, between August 2018 and April 2019

(48) *Kinematics of families of trajectories in mechanics: experiment and theory, Rajendra Prasad Bhatt*, between August 2019 and April 2020

(49) *Quasinormal modes in curved spacetimes: some toy models, Judhajeet Basu*, between August 2019 and April 2020

(50) *Exact gravitational wave spacetimes in modified gravity theories, Siddhant Kumar*, between August 2019 and April 2020

(51) *Analog model of particle creation in expanding universe using waveguides, Shivansh Tomar (EE Dept., Dual degree, BTP)*, between August 2019 and April 2020

(52) *Kinematics of families trajectories in two dimensional mechanical systems, Shipra Verma*, between August 2020 and April 2021

(53) *Shadows of black holes, Rishank Diwan*, between August 2020 and April 2021

(54) *Quasinormal modes and echoes: toy models, Sovan Ghosh*, between August 2020 and April 2021

(55) *The gravitational wave memory effect in linearised gravity and general relativity, Anirban Bairagi*, between August 2021 and April 2022

(56) *Shadows of non-rotating and rotating black holes, Anjan Kar*, between August 2021 and April 2022

(57) *Diffraction by helical structures, Subhamoy Dey*, between August 2021 and April 2022

(58) *Diffraction of light by helical structures: theory, simulation and experimentation, Sakshi Kumar* , between August 2022 and December 2022, BTP1

(59) *Quasinormal modes in simple model leaky cavities and potential barriers, Arijit Bhattacharjee*, between August 2022 and April 2023

(60) *Wave focusing by submerged islands: examples, Abhisek Barman Maji*, between August 2022 and April 2023

(61) *Zero radial pressure spacetime, Einstein cluster models and their stability, Ritwik Acharyya* , between August 2022 and April 2023

(62) *Detection strategies for Stochastic Gravitational Wave Background generated by millisecond pulsars from the Virgo Cluster in the decihertz region, Sakshi Kumar* , between January 2023 and April 2023, BTP2 (primarily supervised by Dr. Sanjit Mitra, IUCAA, Pune).

- **Supervised Phd students** on thesis titled:

  (1) *Studies on gravity and geometry in dimensions* $D \neq 4$, Ratna Koley (2001-2006).

  (2) *Gravitational aspects of warped braneworlds*, Supratik Pal (2002-2006) (Joint supervision with Dr. Narayan Banerjee (Jadavpur University, Kolkata))

  (3) *Probing the universe using redshifted 21 cm HI observations*, Sk Saiyad Ali (2002-2007) (Joint supervision with Dr. Somnath Bharadwaj, IIT Kharagpur)

  (4) *Warped braneworld models: geometry, geodesics and particle creation*, Suman Ghosh(2005-2011).

  (5) *Geometric flows without and with higher order and higher derivative terms* , Sanjit Das (2006-2012).

  (6) *Studies on Born-Infeld theories of gravity*, Soumya Jana (2012-2017).

  (7) *Studies on geodesic focusing and energy conditions in General Relativity and Modified Gravity*, Rajibul Shaikh (2012-2017) (Joint supervisor: Dr. Anirvan DasGupta, IIT Kharagpur).

  (8) *Perturbations of spiky strings in flat and curved backgrounds*, Soumya Bhattacharya (2013-2019) (Joint supervisor: Dr. Kamal L. Panigrahi,IIT Kharagpur).

  (9) *Gravitational wave memory effects in radiative spacetimes of General Relativity and Modified Gravity*, Indranil Chakraborty (2017-2022)

  (10) *Quasinormal modes of black hole mimickers*, Poulami Dutta Roy (2017-2023)

Sponsored Projects :

(i) PI of DST sponsored project titled **Kinematics of flows in diverse contexts** during the period 2005-2009. **Dr. Hemwati Nandan** worked as a Research Associate in this project.

(ii) Co-PI of DST sponsored project titled **Semiclassical strings in AdS/CFT** (PI: Dr. K. L. Panigrahi during the period 2013-2016. **Mr. Soumya Bhattacharya** worked as a JRF in this project.

(iii) CSIR Fellow (Individual), **Mr. Anupam Das** worked during the period 2003-2008 under my supervision.

(iv) NPDF, **Dr. Soumya Chakrabarti** worked during the period 2017-2019 with me as his host.

(v) DST TARE Project with **Dr. Soumya Jana, Sitananda College, Nandigram, WB**, ongoing–2022-2025.

(vi) NPDF, **Dr. Pritam Banerjee**, ongoing–2023-2025.

LIST OF PUBLICATIONS

The red marked references have some pedagogical content.

1. R. P. Bhatt, A. Roy and **S. Kar**, Analog Raychaudhuri equation in mechanics, Resonance, Journal of Science Education **28**, 389 (2023).
2. P. Dutta Roy and **S. Kar**, Generalised Hayward spacetimes: geometry, matter and scalar wave propagation, Phys. Rev. **D 106**, 044028 (2022).
3. **S. Kar**, Wormholes with a warped extra dimension?, Jr. Gen. Rel. Grav. **54**, 66 (2022) (T. Padmanabhan memorial volume).
4. I Chakraborty and **S. Kar**, A simple analytical example of the gravitational wave memory effect, Eur. Phys. J. Plus **137**, 418 (2022).
5. **S. Kar**, Curious variant of the Bronnikov–Ellis spacetime, Phys. Rev. **D 105**, 024013 (2022).
6. S. Chakrabarti and **S. Kar**, A wormhole geometry from gravitational collapse, Phys. Rev. **D 104**, 024071 (2021).
7. S. Basak, P. Dutta Roy and **S. Kar**, A new model with solitary waves: solution, stability and quasinormal modes, Eur. Phys. Jr. Plus **136**, 618 (2021).
8. S. Siddhant, I Chakraborty and **S. Kar**, Kundt geometries and memory effects in the Brans-Dicke theory of gravity, Eur. Phys. Jr. **C 81**, 350 (2021).
9. P. Dutta Roy, S. Aneesh and **S. Kar**, Revisiting a family of wormholes: geometry, matter, scalar quasinormal modes and echoes , Eur. Phys. Jr. **C 80**, 850 (2020).
10. K. Lodha, A. Roy and **S. Kar**, Physics of a particle on a rotating hoop: experiment and theory, Resonance, Journal of Science Education, Indian Academy of Sciences, **25**, 1261 (2020).
11. I. Chakraborty and **S. Kar**, Memory effects in Kundt wave spacetimes, Phys. Letts. **B 808**, 135611 (2020).
12. I. Chakraborty and **S. Kar**, Geodesic congruences in exact plane wave spacetimes and the memory effect , Phys. Rev. **D101**, 064022 (2020).
13. P. Dutta Roy, J. Das and **S. Kar** , Quasinormal modes in asymmetric triangular barrier, Eur. Phys. Jr. Plus **134**. 571 (2019).

14. S. Bhattacharya, **S. Kar** and K. L. Panigrahi, Perturbations of spiky strings in AdS3, JHEP06, 089 (2018).

15. S. Aneesh, S, Bose and **S. Kar**, Gravitational waves from quasinormal modes of a class of Lorrentzian wormholes, Phys. Rev. **D97**, 124004 (2018).

16. R. Shaikh and **S. Kar**, Gravitational lensing n scalar-tensor gravity and energy conditions, Phys. Rev. **D96**, 044037 (2017).

17. S. Jana and **S. Kar**, Born-Infeld gravity with a Brans-Dicke scalar, Phys. Rev. **D96**, 024050 (2017).

18. S. Bhattacharya, **S. Kar** and K. L. Panigrahi, Perturbations of spiky strings in flat spacetimes, JHEP01, 116 (2017).

19. S. Jana and **S. Kar**, Born-Infeld cosmology with scalar Born-Infeld matter, Phys. Rev. **D 94**, 064016 (2016).

20. R. Shaikh and **S. Kar**, Wormholes, the weak energy condition and scalar-tensor gravity, Phys. Rev. **D 94**, 024011 (2016).

21. **S. Kar**, S. Lahiri and S. SenGupta, Can extra dimensional effects allow wormholes without exotic matter?, Phys. Letts. **B 750**, 319 (2015).

22. S. Jana and **S. Kar**, Born-Infeld gravity coupled to Born-Infeld electrodynamics, Phys. Rev. **D 92**, 084004 (2015).

23. **S. Kar**, S. Lahiri and S. SenGupta, A note on spherically symmetric, static solutions in Kanno-Soda on-brane gravity, Gen. Rel. Grav., **47**, 70 (2015).

24. R. Shaikh, **S. Kar**, and A. DasGupta, Evolution of geodesic congruences in a gravitationally collapsing scalar field background, Phys. Rev. **D 90**, 124069 (2014).

25. R. Shaikh, **S. Kar**, and A. DasGupta, Kinematics of trajectories in classical mechanics, Eur. Phys. Jr. Plus **90**, 129 (2014).

26. **S. Kar**, S. Lahiri and S. SenGupta, Radion stability and induced on-brane geometries in a effective, scalar-tensor theory of gravity, Phys. Rev. **D88**, 123509 (2013).

27. S. Jana and **S. Kar**, Perturbative stability of catenoidal soap films, Eur. Phys. J. Plus **128**, 108 (2013).

28. S. Jana and **S. Kar**, Three dimensional Eddington-inspired Born-Infeld gravity: solutions, Phys. Rev. **D88**, 024013 (2013).

29. S. Das, K. Prabhu and **S. Kar**, Higher order geometric flows in locally homogeneous three dimensional spaces, to appear in Jr. Math. Phys. **54**, 013509 (2013).

30. A. DasGupta, H. Nandan and **S. Kar**, Geodesic flows in rotating black hole backgrounds, Phys. Rev. **D 85**, 104037 (2012)

31. A. Dutt, T. Nath, R. Parwani and **S. Kar**, Splitting of degenerate states in one dimensional quantum mechanics, Eur. Phys. Jr. Plus, **127(3)**, 28 (2012).

32. S. Das and **S. Kar**, Bach flow of product manifolds, Int. Jr. Geom. Meth. Mod. Phys. **9**, (2012).

33. K. Prabhu, S. Das and **S. Kar**, On higher order geometric and renormalisation group flows, Jr. Geom. Phys. **61** 1854 (2011).

34. S. Ghosh, A. DasGupta and **S. Kar**,Geodesic congruences in warped spacetimes, Phys. Rev. **D83**, 084001 (2011).

35. A. Dutt and **S. Kar**, Smooth double barriers in quantum mechanics Am. Jr. Phys. **78**, 1352 (2010)).

36. S. Ghosh, H. Nandan and **S. Kar**,Confinement of test particles in warped spacetimes, Phys. Rev. **D 82**, 024040 (2010).

37. S. Das, K. Prabhu and **S. Kar**, Ricci flow on unwarped and warped product manifolds, Int. Jr. Geom. Meth. Mod. Phys. **5**, 837 (2010).

38. S. Ghosh and **S. Kar**, Bulk spacetimes for cosmological braneworlds with a time dependent extra dimension, Phys. Rev. **D 80**, 064024 (2009).

39. A. DasGupta, H. Nandan and **S. Kar**, Kinematics of geodesic flows in stringy black hole backgrounds, Phys. Rev. **D49**, 124004 (2009)

40. A. DasGupta, H. Nandan and **S. Kar**, Kinematics of flows on curved, deformable media , Int. Jr. Geom. Meth. Mod. Phy. **6**, 645 (2009)

41. A. Das, **S. Kar**, S. SenGupta, Stable two-brane models with bulk tachyon matter, Int. Jr. of Mod. Physics **A 24**, 4457 (2009)

42. S. Pal and **S. Kar**, de Sitter branes with a bulk scalar, Jr. Gen. Rel and Grav. **41**, 1165 (2009)

43. S. Ghosh and **S. Kar**, Particle creation in the presence of a warped extra dimension, JCAP08, 001 (2008)

44. **S. Kar**,Introducing the Raychaudhuri equations, Resonance, Journal of Science Education, **13**, 319 (2008)

45. A. Dasgupta, H. Nandan and **S. Kar**, Kinematics of deformable media, Annals of Physics **323**, 1621 (2008)

46. S. Pal and **S. Kar**, Gravitational lensing in braneworld gravity: formalism and applications, Class. Qtm. Grav. **25**, 045003 (2008), Erratum *ibid.* **25** 149801 (2008)

47. **S. Kar** and R. R. Parwani, Can degenerate bound states occur in one dimensional quantum mechanics ?, Europhys. Lett. **80**, 30004 (2007)

48. **S. Kar** and S. SenGupta, The Raychaudhuri equations: a brief review, Pramana: Journal of Physics **69**, 13 (2007)

49. D. Jain, A. Das and **S. Kar**, Path integrals and wave packet evolution for damped mechanical systems, American Journal of Physics **75**, 259 (2007)

50. R. Koley and **S. Kar**,Exact bound states in volcano potentials, Phys. Letts. **A363**, 369 (2007)

51. R. Koley and **S. Kar**,Braneworlds in six dimensions: new models with bulk scalars, Class. Qtm. Grav. **24**, 79 (2007)

52. **S. Kar**, Focusing of branes in warped backgrounds (Special issue dedicated to the memory of A. K Raychaudhuri), Indian Journal of Physics **80**, 873 (2006)

53. T. K. Barik, P. Roy Chaudhuri, A. Roy and **S. Kar**, Probing liquid surface waves, liquid properties and liquid films with light diffraction, Measurement Science and Technology **17**, 1553 (2006).

54. S. Pal and **S. Kar**, Geometry of deformations of branes in warped backgrounds, Class. Qtm. Grav. **23**, 2571 (2006)

55. A. Das, S. Gupta, T. Saini and **S. Kar**, Cosmology with a decaying tachyon matter(to appear in Phys. Rev. **D 72** 043528 (2005).

56. R. Koley and **S. Kar**,A novel braneworld model with a bulk scalar field Phys. Letts. **B623** ,244 (2005).

57. P. Nag, S. Bharadwaj and **S. Kar**, Can the rotation of the dark matter halo of our galaxy be detected through its effect on the cosmic microwave background polarisation JCAP **07**,006 (2005).

58. A. Das and **S. Kar**,The Ellis wormhole with 'tachyon matter' Class. Qtm. Grav. **22** 3045 (2005).

59. T. K. Barik, A. Roy and **S. Kar**, A simple experiment on diffraction of light by interfering liquid surface waves , Am. Jr. Phys. **73**, 725 (2005)

60. S. Pal, S. Bharadwaj and **S. Kar**, Can extra dimensional effects replace dark matter? Phys. Letts. **B 609**, 194 (2005).

61. R. Koley and **S. Kar**, Scalar kinks and fermion localisation in warped spacetimes Class. Quant. Grav. **22**, 753 (2005).

62. R. Koley and **S. Kar**, Bulk phantom fields, increasing warp factors and Fermion localisation Mod. Phys. Letts. **A 20**, 363 (2005).

63. **S. Kar** and M. Sinha, Bending of light and gravitational signals in certain on–brane and bulk geometries Jour. Gen. Rel. and Grav. **35**, 1775 (2003)

64. S. Bharadwaj and **S. Kar**, Modelling galaxy halos using dark matter with pressure, Phys. Rev. **D 68**, 023516 (2003)

65. M. Visser, **S. Kar** and N. Dadhich, Traversable wormholes with arbitrarily small energy condition violations, Phys. Rev. Letts. **90**, 201102 (2003).

66. R. Koley, S. Pal and **S. Kar**, Geodesics and geodesic deviation in a two dimensional black hole, Amer. Jr. Phys. **71**, 1037 (2003).

67. **S. Kar**, S. SenGupta and S. Sur, Static, spherically symmetric solutions, gravitational lensing and perihelion precession in Einstein–Kalb–Ramond theory, Phys. Rev. **D 67**, 044005 (2003).

68. **S. Kar**, P. Majumdar, S. Sengupta and S. Sur Cosmic optical activity from an inhomogeneous Kalb–Ramond field, Class. Qtm. Grav. **19**, 677 (2002).

69. **S. Kar**, P. Majumdar, S. Sengupta, A.Sinha, Does a Kalb–Ramond field make spacetime optically active, European Physical Journal **C 23**, 357 (2002).

70. N. Dadhich,**S. Kar**, S. Mukherjee, M. Visser, R=0 spacetimes and self–dual Lorentzian wormholes, Phys. Rev. **D65** 064004 (2002).

71. **S. Kar**, The geometry of RG flows in theory space, Phys. Rev. **D 64**, 105017 (2001).

72. **S. Kar**, The Einstein equation in a theory of strings , Mod. Phys. Letts. **A 16**, 143 (2001).

73. **S. Kar** and A. Khare, Classical and quantum mechanics of a particle on a rotating loop American Journal of Physics, **68**, 1128 (2000).

74. S. Bose, N.K. Dadhich and **S. Kar**, New classes of black holes in $2+1$ gravity Physics Letters **B 477**, 451 (2000).

75. **S. Kar**, Naked singularities in low energy, effective string theory, Class. Qtm. Grav. **16**, 101, (1999).

76. **S. Kar** and S. Mahapatra, Planetoid strings : solutions and perturbations, Class. Quant. Grav. **15**, 1421 (1998).

77. S. Bose and **S. Kar**,Exact solutions in two–dimensional string cosmology with back reaction, Phys. Rev. **D 56**, R4444 (1997).

78. **S. Kar**, Scale factor duality and the energy condition inequalities, Phys. Letts. **B 401**, 234(1997).

79. **S. Kar**, Focusing of timelike worldsheets in a theory of strings, Phys. Rev. **D 55**, 7921 (1997).

80. **S. Kar**, Stringy black holes and energy conditions, Phys. Rev. **D 55**, 4872 (1997).

81. **S. Kar**, Generalised Raychaudhuri equations for strings in the presence of an anti-symmetric tensor field, Phys. Rev. **D 54**, 6408 (1996).

82. **S. Kar**, Schild's null strings in flat and curved backgrounds, Phys. Rev. **D 53** , 6842 (1996).

83. **S. Kar**, Generalised Raychaudhuri equations: examples, Phys. Rev. **D 53**, 2071 (1996).

84. **S. Kar** and D. Sahdev, Evolving Lorentzian wormholes, Phys. Rev. **D 53**, 722 (1996).

85. **S. Kar**, Strings in a wormhole background, Phys. Rev **D 52**, 2036 (1995)

86. **S. Kar** and D. Sahdev, Restricted class of traversable wormholes with traceless matter, Phys. Rev **D 52**, 2030 (1995)

87. **S. Kar**, S. Minwalla, D. Mishra and D. Sahdev, Resonances in transmission of massless scalar waves in a class of wormholes Phys.Rev **D 51**, 1632 (1995).

88. A. Bhattacharyya and **S. Kar**, Tunneling in magnetic fields, Int. Jour. of Theor. Phys **34**, 63 (1995).

89. **S. Kar**, Evolving wormholes and the weak energy condition, Phys. Rev. D **49**, 862 (1994).

90. **S. Kar**, D. Sahdev and B. Bhawal, Scalar waves in a wormhole geometry, Phys. Rev. D. **49**, 853 (1994).

91. B. Bhawal and **S. Kar**, Lorentzian wormholes in Einstein-Gauss-Bonnet theory, Phys. Rev. D. **46**, 2464 (1992)

92. **S. Kar**, An instanton approach to quantum tunnelling for a particle on a rotating circle, Phys. Lett. A **168**, 179 (1992)

CONFERENCE PROCEEDINGS

- **S. Kar**, Generalised Raychaudhuri equations for strings and membranes IP–BBSR–96/25, hep-th/9604046 (Proceedings of IAGRG XVIII (Feb 15-17, 1996 held at Matscience, Madras), Matscience Report No. 117

- **S. Kar**, Geometry of theory space and RG flows (Proceedings of IGQR I (Dec 17–21, 2001) held at IUCAA, Pune), Mod. Phys. Letts **A17**, 1037 (2002), hep-th/0205264

- **S. Kar**, Cosmic optical activity from a Kalb–Ramond field (Proceedings of NEB-X, May 30–June 2, 2002 held at Thessaloniki, Greece), Pg. 123 , World Scientific, Singapore

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SOME OTHER PROFESSIONAL ACTIVITIES

- Convenor, LOC and Member, SOC of ICGC2000 (IIT Kharagpur).

- Member, SOC in ICGC2004 (CUSAT, Kochi).

- Member, SOC in several IAGRG meetings.

- Chair, SOC, 28th IAGRG meeting at RRI, Bangalore

- Member, IAGRG Council, 2002-2006, 2020-2022

- Secretary, IAGRG, 2010-2014

- Convenor, CTS, IIT Kharagpur, 2013-2016

- President, IAGRG, 2018-2020

- Member, Editorial Board, Indian Journal of Physics