

**Name: Dr. Sarbari Guha**

**Department:** Physics

**Designation:** Associate Professor, Head (2007-2010)

**Email ID:** [srayguha@yahoo.com](mailto:srayguha@yahoo.com), [guha@sxccal.edu](mailto:guha@sxccal.edu)

**Last Refresher Course attended:** Eleventh Refresher Course in Physics, ASC, CU, January 1-21, 2004.

**Research Field:** General Relativity, Cosmology, Relativistic Astrophysics



### **Awards and Distinctions**

- (i) **Young Scientist Award** of the *Indian Science Congress Association* in **Physics** at the 82<sup>nd</sup> session in 1995.
- (ii) **Certificate** in the *Colloquium of Young Physicists*, Indian Physical Society, 1991.
- (iii) **National Scholarship** in Physics Honors in the B.Sc. (Honors) Examination of Calcutta University.
- (iv) **State Merit Certificate** in the Madhyamik Examination of West Bengal Board of Secondary Education.

### **Research Achievements and Visits abroad**

- i. **Visiting Associate of IUCAA** (India) from August, 2006 onwards.
- ii. **Principal Investigator**, CSIR Major Research Project entitled “*Universal Thermodynamics in Modified Theories of Gravity*”, with effect from 01/05/2018. Total grant approximately Rupees Eighteen Hundred Thousand **for three years** (Rs. 1800,000/-). Ongoing.
- iii. **Invited speaker and Member of the International Scientific committee** at the International Symposium on “*Nonlinear Dynamics*” organized by the Mathematical Institute of the Serbian Academy of Sciences and Arts, in Belgrade during September 2019.  
**Presented an Invited paper** entitled “*Non-Linear Dynamical Systems in General Relativity and Cosmology*”, at the International Symposium on “*Nonlinear Dynamics*”, Belgrade, Serbia, 04-06 September 2019.  
**Delivered an Invited Lecture** on “Some Aspects of General Relativity and Cosmology”, at the Mathematical Institute of Serbian Academy of Sciences and Arts, Belgrade, on September 09, 2019.
- iv. **Attended the second BRICS Symposium on Gravity, Astrophysics and Cosmology, and the 2018 South Africa Gravity Society Meeting** in Durban, South Africa during 22-28 October, 2018. Scientifically interacted with the faculty members, students and postdoctoral fellows at the Astrophysics and Cosmology Research Unit (ACRU), School of Mathematics, Statistics and Computer Sciences, University of KwaZulu-Natal, Durban, South Africa, 29-31 October, 2018.  
**Presented a paper** entitled “*Non-adiabatic spherical collapse in  $f(R,T)$  theory of gravity*”, at the BRICS Symposium on Gravity, Astrophysics and Cosmology, Durban, South Africa, 22 – 26 October 2018.

**Delivered an Invited Lecture on** “*Thermodynamic analysis and the generalized second law in some Chaplygin gas models*”, at the School of Mathematics, University of KwaZulu-Natal, Durban, South Africa, on October 30, 2018.

Scientifically interacted with the faculty members, students and postdoctoral fellows at the Astrophysics and Cosmology Research Unit (ACRU), School of Mathematics, Statistics and Computer Sciences, University of KwaZulu-Natal, Durban, South Africa, 29-31 October, 2018. Officiated as the External examiner for the Honours students’ presentations of the Department of Maths and Applied Maths, University of KwaZulu-Natal, Durban, South Africa, on 31st October 2018.

- v. **Principal Investigator**, UGC Minor Research Project entitled “*A Study of the Dynamics of the Universe: theory vis-à-vis the recent observational data*”, with effect from December 20, 2006 to December, 2008 (PSW -059/06-07 (ERO) dated 06 Nov 2006). Completed.
- vi. **Post-Doctoral Research Fellow** in the **Department of Physics, Queen’s University, Kingston, CANADA**, as a member of the research group in **Astronomy, Astrophysics and Relativity**, from October 1, 2004 to September 30, 2005.
- vii. Visited JAPAN, in August 2002 to **Chair** a technical session and to present a **paper** at the **6th International Conference on Differential Geometry** organized by the TENSOR Society of Japan at Tokyo.
- viii. Visited France in August 1996 for one week at the University of Lille.

#### **Professional/Administrative Activities**

- ❑ **Head** of the Department of Physics at St. Xavier’s College, Kolkata during 2007-2010.
- ❑ During her tenure as the HOD, she initiated the publication of the annual departmental magazine **HORIZON** and the annual seminar of the department, named as **SPECTRUM**.
- ❑ Initiated and coordinated the **J. C. Bose Memorial Lecture** at St. Xavier’s College during the 150th birth anniversary of Sir J. C. Bose.
- ❑ **External Examiner of Ph.D. thesis, Department of Mathematics, Nagpur University.**
- ❑ **External examiner** for the Honours students’ presentations of the Department of Maths and Applied Maths, University of KwaZulu-Natal, Durban, South Africa.
- ❑ **Guest lecturer at the Department of Physics, Jadavpur University** for three successive sessions from 2014-15 to 2016-17, and delivered two lectures per week at the master's level.
- ❑ **Emceed** the One Day J. C. Bose Symposium **organized by Bose Institute** in St. Xavier’s College Campus on 30<sup>th</sup> November, 2008.
- ❑ **Editor** of the Physics Department magazine, Horizon in 2009, **Associate Editor** in 2010, 2014, 2017, 2018, and 2019-2020 (combined volume).
- ❑ **Teacher-in-charge** of the entire Laboratory of the Department during the period **2003-2004 till she left for Canada in 2004.**
- ❑ **Local Coordinator**, The Vaidya-Raychaudhuri Lecture, St. Xavier's College (Kolkata), 14<sup>th</sup> November, 2011. Speaker: Professor Sanjeev Dhurandhar.
- ❑ Member, Organizing Committee, **National Seminar on Applications of Statistics in Natural Sciences**, organized by St. Xavier’s College (Autonomous), Kolkata and IUCAA Centre for Astronomy Research and Development, Kolkata, December 16<sup>th</sup> – 17<sup>th</sup>, 2019.
- ❑ Member, Organizing Committee, **National Seminar on History and Philosophy of Science**, in honor of Late Professor M.C. Chaki’s 99<sup>th</sup> Birth Anniversary, July 2<sup>nd</sup> & 3<sup>rd</sup>, 2011, Calcutta Mathematical Society.
- ❑ **Participated** in the Question Bank Project Workshop conducted by the Staff Selection Commission, Govt. of India, ERO on 22-23 November, 2007, in Kolkata.
- ❑ **Chair Person** of a Scientific Session in *The 6<sup>th</sup> International Conference of Tensor Society on Differential Geometry & Its Applications*, at Tsukuba, Japan, August 5-9, 2002.
- ❑ Member of **International Advisory Committee** of the **International Conference on Theoretical Physics** at the University of Nis, Yugoslavia in August 2003.

- Member, Local Organizing Committee, **International Symposium on Analysis, Manifolds and Mechanics**, Prof. M. C. Chaki's 90<sup>th</sup> birth anniversary, M. C. Chaki Centre for Mathematics and Mathematical Sciences, Calcutta, Feb. 5-7, 2003.
- Member, Local Organizing Committee, **National Seminar on Differential Geometry, Relativity & Astrophysics**, jointly organized by St. Xavier's College, Birla Planetarium, & Dept. of Pure Mathematics, Calcutta University Nov.12-14, 1992.

#### Invited talks abroad

- ❖ Invited Talk, "Some Aspects of General Relativity and Cosmology", at the Mathematical Institute of Serbian Academy of Sciences and Arts, Belgrade, on September 09, 2019
- ❖ Invited Talk, "*Thermodynamic analysis and the generalized second law in some Chaplygin gas models*", School of Mathematics, University of KwaZulu-Natal, Durban, South Africa, October 30, 2018.
- ❖ Invited Talk, "*On Some Space-times of General Relativity*", Department of Physics, Queen's University, Kingston, Canada, August 06, 2004.
- ❖ Invited Talk, "*On fluid Pseudo Ricci Symmetric space-time of general relativity*" during the **6<sup>th</sup> International Conference of Tensor Society on Differential Geometry & Its Applications**, at the Tensor Society of Japan, Tsukuba, August 5-9, 2002.
- ❖ Invited Speaker at the **International Conference on Theoretical Physics** held at the **University of Nis, Yugoslavia** in August, 2003.
- ❖ Invited Speaker in the 10th International Conference on DIFFERENTIAL GEOMETRY AND ITS APPLICATIONS, dedicated to the 300th Birthday of Leonhard Euler, August 27 - 31, 2007, Olomouc, Czech Republic

#### International Collaborations:

UKZN, Durban, South Africa.

Queen's University, Kingston, Ontario, Canada

#### Research Experience

Post-Doctoral Work: General Relativity, Relativistic Astrophysics and Cosmology.

#### Publications in International peer reviewed Journals: 23

#### Publications and / or presentations in conferences: 40

#### Details of the Ph.D. Supervision:

1. Mr. Pinaki Bhattacharya, awarded Ph.D. degree from Jadavpur University in January 2017.
2. Md. Inzamal Haque, Registered in St. Xavier's College (Autonomous), Kolkata.
3. Samarjit Chakraborty, Registered in St. Xavier's College (Autonomous), Kolkata.
4. Sucheta Datta, Registered in St. Xavier's College (Autonomous), Kolkata.
5. Uttaran Ghosh, Registered in St. Xavier's College (Autonomous), Kolkata.

#### Experience as Resource Person

- Resource Person at the Refresher Course in Physics (June 18 – July 09, 2013), Academic Staff College, University of Calcutta.
- Resource Person at DST Inspire Science Camp, in Howrah, 13<sup>th</sup> July, 2016.
- Resource Person at TEQIP program, in Narula Institute of Technology, 9<sup>th</sup> March, 2017.
- Resource Person in the UGC- DSA program at the Department of Physics, Jadavpur University, 4<sup>th</sup> January 2018.

## **Reviewership of Journals**

**Reviewer** of Advances in High Energy Physics (Hindawi)

**Reviewer** of Entropy – a MDPI Journal

**Reviewer** of Modern Physics Letters A (World Scientific)

**Reviewer** of Gravitation and Cosmology (published by Russian Gravitational Society)

**Reviewer** of Canadian Journal of Physics

**Reviewer** of International Journal of Theoretical Physics

**Reviewer** of Pramana – Journal of Physics

**Reviewer** of Thai Journal of Physics

**Reviewer** of MATHEMATICAL REVIEWS

## **Membership of Professional bodies**

- Life Member, Indian Association for General Relativity and Gravitation.
- Life Member, Indian Physical Society.
- Life Member, Indian Science Congress Association.
- Life Member, Calcutta Mathematical Society.

## **PREPRINTS AND BACKGROUND PAPERS**

1. **Sucheta Datta and Sarbari Guha**, *Propagation of Axial and Polar Gravitational Waves in Kantowski-Sachs Universe* (arXiv:2106.03203v1 [gr-qc])
2. **Samarjit Chakraborty, Sarbari Guha, and D. Panigrahi**, (arXiv:1906.12185v1 [gr-qc])
3. **Sarbari Guha and Pinaki Bhattacharya**, *Confinement and stability in presence of scalar fields and perturbation in the bulk* ([gr-qc/1412.7832](#))
4. **Sarbari Guha and Pinaki Bhattacharya**, *Models of Gravity in Five-dimensional Warped Product Spacetimes* ([gr-qc/1005.3091](#))
5. **Sarbari Guha**, *Higher-dimensional Embedding of Four-dimensional Hypersurfaces: Chronological Development of Co-dimension-1 Embedding* ([gr-qc/0809.3435](#))

## **PUBLICATION IN INTERNATIONAL JOURNALS**

1. **Sarbari Guha and Uttaran Ghosh**, *Dynamical conditions and causal transport of dissipative spherical collapse in  $f(R, T)$  gravity*, **European Phys. J. Plus**, Vol. 136, (2021) 460.
2. **Samarjit Chakraborty, Sarbari Guha, and Rituparno Goswami**, *An investigation on gravitational entropy of cosmological models*, **International Journal of Modern Physics D**, Vol. 30, (2021) 2150051.
3. **Sarbari Guha** and Sucheta Datta, *Axial Gravitational Waves in Bianchi I Universe*, **International Journal of Modern Physics D**, Vol. 29, (2020) 2050116.
4. **Sarbari Guha** and Samarjit Chakraborty, *On the gravitational entropy of accelerating black holes*, **International Journal of Modern Physics D**, Vol. 29, (2020) pp. 2050034.
5. Samarjit Chakraborty and **Sarbari Guha**, *Thermodynamics of FRW universe with Chaplygin gas models*, **General Relativity and Gravitation**, Vol. 51, (2019) pp. 158.
6. **Sarbari Guha** and Pinaki Bhattacharya, *Five-dimensional warped product space-time with time-dependent warping and a scalar field in the bulk*, **Gravitation and Cosmology**, Vol. 24, (2018) pp. 274-284
7. Pinaki Bhattacharya and **Sarbari Guha**, *Particle Motion and Perturbed Dynamical System in Warped Product Spacetimes*, *Int. J. Theor. Phys.*, 55 (2016) pp. 3375–3392
8. **Sarbari Guha** and Ranajoy Banerji, *Dissipative Cylindrical Collapse of Charged Anisotropic Fluid*, *Int. J. Theor. Phys.*, 53 (2014) pp. 2332-2348.
9. **Sarbari Guha** and Pinaki Bhattacharya, *Gravity in five-dimensional warped product spacetimes with time-dependent warp factor*, *Journal of Physics: Conference Series* 484 (2014) 012015-5

10. **Sarbari Guha**, Pinaki Bhattacharya and Subenoy Chakraborty, *Particle motion in the field of a five-dimensional charged black hole*, *Astrophys. Space Sci.* 341 (2012) 445–455
11. **Sarbari Guha** and Pinaki Bhattacharya, *Geodesic Motions near a Five-dimensional Reissner–Nordström Anti-de Sitter black hole*, *Journal of Physics: Conference Series* 405 (2012) 012017-4.
12. Pinaki Bhattacharya and **Sarbari Guha**, *A Dynamical Systems Analysis of Motion in the Bulk with respect to the Brane*, *Physica Scripta*, [85 \(2012\) 025001-8](#)
13. **Sarbari Guha** and Subenoy Chakraborty, *Five-Dimensional Warped Product Space-Time with Time-Dependent Warp Factor and Cosmology of the Four-Dimensional Universe*, *Int. J. Theor. Phys.*, 51 (2012) 55–68
14. **Sarbari Guha** and Subenoy Chakraborty, *Brane Cosmology and Motion of Test Particles in Five-Dimensional Warped Product Spacetimes*, *Gen. Relativ. Gravit.*, 42 (2010) 1739–1754
15. **Sarbari Ray-Guha**, *On Perfect Fluid Pseudo Ricci Symmetric Space-time*, *TENSOR N.S.*, Vol. 67, No. 1 (2006), pp. 101-107.
16. **Sarbari Ray-Guha**, *Space-Times admitting vanishing projective curvature tensor*, *TENSOR N.S.*, Vol.65, No.3 (2004), pp. 272-276.
17. **Sarbari Guha**, *On Quasi Einstein and Generalized Quasi Einstein Manifolds and their applications*, *FACTA UNIVERSITATIS, Ser: Mech. Auto. Control & Rob.* Vol. 3, No.14 (2003), pp. 821-842.
18. **Sarbari Guha**, *On a Perfect Fluid Space-Time with Quasi-Conformal Curvature Tensor*, *FACTA UNIVERSITATIS, Ser: Mech. Auto. Control & Rob.* Vol. 3, No.14 (2003), pp. 843-849.
19. M. C. Chaki and **Sarbari Ray-Guha**, *On a type of space-time of General Relativity*, *TENSOR N.S.*, Vol.64, No. 3 (2003), pp.227-231.
20. **Sarbari Ray-Guha**, *On fluid Pseudo Ricci Symmetric space-time of general relativity*, *TENSOR N.S.*, Vol.63, No. 3 (2002) pp. 252-257.
21. **Sarbari Ray**, *On a Type of General Relativistic Perfect Fluid Space-Time with Divergence-free Projective Curvature Tensor*, *TENSOR N.S.*, Vol.61 (1999), pp.176-180.
22. B. Chaki, **Sarbari Ray** and A. Konar, *On Chaki Pseudo Symmetric Perfect Fluid Space-Time*, *Bulgarian Journal of Physics*, Vol.26, Nos. 5/6, (1999), pp.204-209.
23. M.C. Chaki and **Sarbari Ray**, *Space-Times with Covariant-Constant Energy- Momentum Tensor*, *International Journal of Theoretical Physics*, Vol.35, No.5, (1996), pp.1027-1032.

#### CONFERENCE PROCEEDINGS AT THE NATIONAL LEVEL

1. B. Chaki and **Sarbari Ray**, “Four-Dimensional Cosmological model with shear-free perfect fluid in a Pseudo Ricci Symmetric Space-time,” *Proc. Colloquium of Young Physicist*, Organized by Indian Physical Society, **Physics Teacher**, 1991, Vol. 33, pp. 115-117.
2. **Sarbari Ray** and B. Chaki, “A type of homogeneous pure radiation in a Pseudo Ricci Symmetric Space-time,” *Proc. Nat. Seminar on Mathematical Modeling, Jadavpur University*, March 7-8, 1994, Vol. 2, pp. 97-104.
3. **Sarbari Ray** and B. Chaki, “On some homogeneous weak plasma pure radiation field in a Pseudo Ricci Symmetric Space-time,” *Proceedings of Saha centenary Symposium on Plasma Science and Technology (PLASMA 93)*, Dept. of Physics, **Allahabad University**, Oct. 11-14, 1993, pp.239-242.
4. B. Chaki and **Sarbari Ray**, “Four-Dimensional Cosmological model with shear-free perfect fluid in a Pseudo Ricci Symmetric Space-time,” *Proc. Colloquium of Young Physicist*, Organized by **Indian Physical Society**, *Physics Teacher*, 1991, Vol. 33, pp. 115-117.

#### FEATURE ARTICLES IN JOURNALS / MAGAZINES

1. **Sarbari Ray-Guha** “*PROF. M. C. CHAKI and M. C. Chaki Centre for Mathematics and Mathematical Sciences, Calcutta*”, *FACTA UNIVERSITATIS, Series: Mechanics, Automatic Control and Robotics* Vol.3, No 13, 2003, pp. 779 – 780

2. **Sarbari Guha**, "*Professor Manindra Chandra Chaki: A Memoir*", Ganitacharya Manindra Chandra Chaki, Janma Shatabarsha Smarak, published by M. C. Chaki Centre of Mathematics and Mathematical Sciences, July 2012, pp. 90-92.
3. **Sarbari Guha**, "*From Quantum Theory to Gravitational Waves: Einstein's Legacy*", PEBBLES, Science Magazine of St. Xavier's college, Kolkata, 2016.
4. **Sarbari Guha**, "*Stephen Hawking: The Indomitable Mind*", HORIZON, Annual Magazine of Physics Department, St. Xavier's college, Kolkata, 2017-2018.

## PAPERS PRESENTED IN CONFERENCES

1) International : date, place and the title of the paper

1. **Sarbari Guha**, "*Generalized Second Law of Thermodynamics in FRW Universe with Chaplygin Gas Models*", International Conference on Gravitation and Cosmology (ICGC 2019), IISER Mohali, 10<sup>th</sup> to 13<sup>th</sup> December, 2019.
2. **Sarbari Guha** and **Samarjit Chakraborty**, "*Gravitational entropy of accelerating black holes*", International Conference on Gravitation and Cosmology (ICGC 2019), IISER Mohali, 10<sup>th</sup> to 13<sup>th</sup> December, 2019.
3. Samarjit Chakraborty, **Sarbari Guha**, and Rituparno Goswami, "*An investigation on gravitational entropy of cosmological models*", International Conference on Gravitation and Cosmology (ICGC 2019), IISER Mohali, 10<sup>th</sup> to 13<sup>th</sup> December, 2019.
4. Sucheta Datta and **Sarbari Guha**, "*Propagation of Gravitational Waves in Anisotropic Universe*", International Conference on Gravitation and Cosmology (ICGC 2019), IISER Mohali, 10<sup>th</sup> to 13<sup>th</sup> December, 2019.
5. **Sarbari Guha**, "*Non-adiabatic spherical collapse in  $f(R,T)$  theory of gravity*", BRICS Symposium on Gravity, Astrophysics and Cosmology, Durban, South Africa, 22 – 26 October 2018.
6. **Sarbari Guha** and Sukanta Das, "*Noether Symmetry Analysis of FRW model in presence of generalised scalar-gravity interaction*", International Conference on Post-Planck Cosmology: Enigma, Challenges and Visions, IUCAA, Pune, 9<sup>th</sup> – 12<sup>th</sup> October, 2017.
7. **Sarbari Guha**, "*Warped Product space-time with time-dependent warping and a scalar field in the bulk*" at the 29<sup>th</sup> meeting of Indian Association of General Relativity and Gravitation, IIT Guwahati, 18<sup>th</sup> – 20<sup>th</sup> May, 2017.
8. **Sarbari Guha** and Pankaj Joshi, "*Bouncing models in perfect fluid collapse*", International Conference on Recent Advances in Mathematics (ICRAM 2014), Department of Mathematics, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, 20th - 23rd January, 2014.
9. **Sarbari Guha**, "*Geometrical dark energy in braneworlds from time-dependent warp factor*" Physical Sciences Section of 100<sup>th</sup> Indian Science Congress, Kolkata, January 03-07, 2013.
10. **Sarbari Guha**, "*Warped Product Space-Times and Localization of Gravity*", The 12<sup>th</sup> International Conference On Differential Geometry and its Applications And Informatics Besides, organized by University of Calcutta and Tensor Society of Japan, Calcutta, 17th to 21st December, 2012.
11. **Sarbari Guha**, Pinaki Bhattacharya and Subenoy Chakraborty, "*Geodesic Motions near a five-dimensional Reissner-Nordström Anti-de Sitter black hole*", International Conference On Modern Perspectives Of Cosmology And Gravitation, Indian Statistical Institute, February 7 - 11, 2012.
12. Pinaki Bhattacharya and **Sarbari Guha**, "*Particle confinement and perturbed dynamical system in warped product space-time*", International Conference On Modern Perspectives Of Cosmology And Gravitation, Indian Statistical Institute, February 7 - 11, 2012.

13. **Sarbari Guha**, "A dynamical systems study of various cosmological models: critical points and nature of geodesics", *International Conference on Dynamical Systems: Theory and Applications*, Jadavpur University, Calcutta, January 11-14, 2012.
14. **Sarbari Guha** and Pinaki Bhattacharya, "Gravity in Five-dimensional Warped Product Spacetimes with time-dependent warp factor", *International Conference on Gravitation and Cosmology [ICGC2011]*, December 14-19, 2011 GOA, India.
15. **Sarbari Guha**, "Confinement of Particles In Submanifolds Embedded In Warped Product Spaces," *International Symposium on Recent Advances in Mathematics and its Applications (ISRAMA 2008)*, Calcutta Mathematical Society, Calcutta, Dec. 19-21, 2008.
16. **Sarbari Ray-Guha**, "Generalized Quasi Einstein Manifold and its Application to General Relativity," *International Symposium on Recent Advances in Mathematics and its Applications (ISRAMA 2003)*, Calcutta Mathematical Society, Calcutta, Dec. 20-22, 2003.
17. M. C. Chaki and **Sarbari Ray-Guha**, "Conformally flat perfect fluid Pseudo Ricci Symmetric space-time," *International Symposium on Analysis, Manifolds and Mechanics*, Prof. M. C. Chaki's 90<sup>th</sup> birth anniversary, M. C. Chaki Centre for Mathematics and Mathematical Sciences, Calcutta, Feb. 5-7, 2003
18. **Sarbari Ray-Guha**, "On fluid Pseudo Ricci Symmetric space-time of general relativity," *The 6<sup>th</sup> International Conference On Differential Geometry and its Applications*, Tensor Society of Japan, Tsukuba, Japan, Aug. 5-9, 2002.
19. **Sarbari Ray**, "On fluid generalized Pseudo Ricci Symmetric space-time of general relativity," *International Symposium on Mathematics and its Applications (ISMA 2001)*, Calcutta Mathematical Society, Calcutta, Feb. 17-19, 2001.
20. **Sarbari Ray**, "On a type of general relativistic perfect fluid space-time," *5<sup>th</sup> International Conference On Differential Geometry and its Applications*, organized by University of Calcutta and Tensor Society of Japan, Calcutta, Dec. 21-25, 1998.
21. **Sarbari Ray** and B. Chaki, "On a type of Pseudo Ricci Symmetric cosmological string universe," *International Symposium on M. N. Saha, S. N. Bose and N. R. Sen: Contributions to Astrophysics and Impact*, Nov. 28-30, 1995.

2) National: date, place and the title of the paper

1. **Sarbari Guha**, "On the gravitational entropy of transversable wormholes", National Seminar on Recent Advances in Astrophysics and Cosmology, ICARD , Physics Department, North Bengal University, during March 24-25, 2021.
2. **Sarbari Guha**, "Universal Thermodynamics with Chaplygin gas models", **30<sup>th</sup> meeting of the IAGRG** ,BITS-Pilani Hyderabad, during January 3-5, 2019.
3. Samarjit Chakraborty, **Sarbari Guha** and Dibyendu Panigrahi, "Evolution of FRW universe in variable modified Chaplygin gas model", **30<sup>th</sup> meeting of the IAGRG** ,BITS-Pilani Hyderabad, during January 3-5, 2019.
4. Sukanta Das and **Sarbari Guha**, "Noether Symmetry Analysis of anisotropic universe in presence of non-minimally coupled tachyon field", **30<sup>th</sup> meeting of the IAGRG** ,BITS-Pilani Hyderabad, during January 3-5, 2019.
5. **Sarbari Guha**, "Warped product space-time with time-dependent warping and a scalar field in the bulk", **29<sup>th</sup> meeting of the IAGRG** ,IIT Guwahati, during May 18-20, 2017.
6. **Sarbari Guha**, and Ranajoy Banerji, "Study of charged radiating cylindrical collapse of anisotropic fluid with shear", **27<sup>th</sup> meeting of the IAGRG** , H. N. Bahuguna Garhwal University, Garhwal, Srinagar during March 7-9, 2013.
7. Pinaki Bhattacharya and **Sarbari Guha**, "Time and extra dimension dependent scalar field in the bulk ", **27<sup>th</sup> meeting of the IAGRG** , H. N. Bahuguna Garhwal University, Garhwal, Srinagar during March 7-9, 2013.
8. **Sarbari Guha**, Pinaki Bhattacharya and Subenoy Chakraborty, "Five-dimensional Warped Product Spacetimes with time-dependent warp factor and cosmology of the braneworld",

- 26<sup>th</sup> meeting of the IAGRG**, Harish-Chandra Research Institute, Allahabad, January 19-21, 2011.
9. Pinaki Bhattacharya and **Sarbari Guha**, "*Dynamical Characteristics and Geodesic Deviations in Warped Product Space Time*", **26<sup>th</sup> meeting of the IAGRG**, Harish-Chandra Research Institute, Allahabad, January 19-21, 2011.
  10. **Sarbari Guha** and Subenoy Chakraborty, "*Brane Cosmology and Motion of Test Particles in Five-Dimensional Warped Product Spacetimes*," **25<sup>th</sup> meeting of the IAGRG**, Saha Institute of Nuclear Physics, January 28-31, 2009.
  11. **Sarbari Guha**, "*Phase Portrait of Many Component FLRW models*," Conference cum Seminar on the **Emerging Trends in Physics**, **SGTB Khalsa College**, University of Delhi, September 20-23, 2006.
  12. **Sarbari Guha**, "*On the Flatness Problem and FLRW models*," Nat. Seminar on Advances in Mathematics and Applications, **Department of Mathematics, University of Burdwan**, Burdwan, Jan. 18-20, 2006.
  13. **Sarbari Ray**, "On a type of general relativistic perfect fluid space-time," *Proc. 82<sup>nd</sup> Indian Science Congress*, Part II, **Young Scientist Abstracts**, p.8., 1995.
  14. **Sarbari Ray** and B. Chaki, "A type of homogeneous pure radiation in a Pseudo Ricci Symmetric Space-time," *Proc. Nat. Seminar on Mathematical Modeling*, **Jadavpur University**, March 7-8, 1994, Vol. 2, pp. 97-104.
  15. **Sarbari Ray** and B. Chaki, "On some homogeneous weak plasma pure radiation field in a Pseudo Ricci Symmetric Space-time," **Proceedings of Saha centenary Symposium on Plasma Science and Technology (PLASMA 93)**, Dept. of Physics, **Allahabad University**, Oct. 11-14, 1993, pp.239-242.
  16. B. Chaki and **Sarbari Ray**, "A free-free anisotropic spatially homogeneous bulk viscous cosmological model in a Pseudo Ricci Symmetric Space-time of General Relativity," *Nat. Seminar on Differential Geometry, Relativity and Astrophysics*, in memory of Rev. Father Goreux, Calcutta, Nov. 12-14, 1992.
  17. B. Chaki and **Sarbari Ray**, "Static shear-free perfect flow in a Pseudo Ricci Symmetric Space-time of General Relativity," *Nat. Seminar on Mathematics*, **Dept. of Pure Mathematics, University of Calcutta**, Dec. 18-20, 1991.
  18. B. Chaki and **Sarbari Ray**, "Four-Dimensional Cosmological model with shear-free perfect fluid in a Pseudo Ricci Symmetric Space-time," *Proc. Colloquium of Young Physicist*, Organized by **Indian Physical Society**, Physics Teacher, 1991, Vol. 33, pp. 115-117.
  19. B. Chaki and **Sarbari Ray**, "On some properties of a shear-free perfect flow in a Pseudo Ricci Symmetric Space-time," *Proc. 78<sup>th</sup> Indian Sc. Congress*, Indore, 1991, Part III (Abstracts), p.46.

3) Regional: date, place and the title of the talk

1. **Sarbari Guha**, "An Interesting Feature of Perfect Fluid Collapse", Topical Conference on Gravity and Cosmology - Eastern Region, Presidency University, August 9th, 2014.

**Seminar Lectures / Invited Talks in India**

1. Invited Seminar Lecture "The problem of Gravitational Entropy", One-Day State level meeting, Relativity & Cosmology Research Centre, Department of Physics, Jadavpur University, 6th March 2020.
2. Invited Seminar Lecture "Status of the Generalized Second Law of Thermodynamics in Chaplygin gas models", One-Day State level meeting, Relativity & Cosmology Research Centre, Department of Physics, Jadavpur University, March 15, 2019.
3. Colloquium lecture "Gravitational Collapse", Presidency University, February 13, 2019.
4. Seminar Lecture "**Dissipative Collapse in Modified Theories of Gravity**", IUCAA, Pune, June 26, 2018.



5. Invited Lecture at Vivekananda College, Thakurpukur, Kolkata, 6<sup>th</sup> April 2018, "The Life and Works of Stephen William Hawking"
6. Resource Person in the UGC DSA program at the Department of Physics, Jadavpur University, 4<sup>th</sup> January 2018, "Revisiting the Fundamentals of Electronic Devices".
7. Invited Talk at National Workshop "CELEBRATING THE CENTENARY OF EINSTEIN'S GENERAL RELATIVITY-2017: Hundred Years with 'Λ' (CCEGR-2017)", Department of Mathematics, The University of Burdwan, 27<sup>th</sup> July, 2017, "General Relativity: Why and How".
8. Resource Person in the TEQIP Program at Narula Institute of Technology, 9<sup>th</sup> March, 2017, "From Continuum to Quantum".
9. Invited Talk at the Annual Seminar of Physics Alumni Association, Lady Brabourne College, Kolkata, 18<sup>th</sup> December, 2016, "My Research in North America".
10. Resource Person at DST Inspire Science Camp, ODGI Engineering College, Howrah, 13<sup>th</sup> July 2016, "Sir Albert Einstein and His Works".
11. Seminar Lecture, "**Some Results In Modified Gravity Theories**", IUCAA, Pune, June 21, 2016.
12. Seminar Lecture, "**Consequences of Time-dependent warp factor**", IUCAA, Pune, June 23, 2015.
13. Resource Person at the Refresher Course in Physics (June 18 – July 09, 2013), Academic Staff College, University of Calcutta. Topic: Gravitational Collapse.  
Date & Time: **June 21, 2013** at 12:00 noon.
14. Seminar Lecture, "*A Study of the cylindrical collapse of charged fluid in presence of dissipative effects*", IUCAA, Pune, June 04, 2013.
15. Seminar Lecture, "Five dimensional gravity with time dependent warp factor", Relativity and Cosmology Research Centre, Jadavpur University, September **04, 2012**.
16. Seminar Lecture, "Five-dimensional bulk with a time-dependent warp factor and its consequences on brane cosmology", Relativity and Cosmology Research Centre, Jadavpur University, September 14, 2010.
17. Invited Talk, "*Exploring General Relativistic Space-times through the study of geodesics*", IUCAA Reference Centre, Department of Statistics, University of Calcutta, November 14, 2009.
18. Invited Talk, "*The Geometric description of Physics*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, October 20, 2009.
19. Invited Talk, "*On the Embedding of Four-Dimensional Hypersurfaces*" Seminar on the occasion of the 96<sup>th</sup> Birth Anniversary of Prof. M. C. Chaki, Calcutta Mathematical Society, July 01, 2008.
20. Seminar Lecture, "*A brief review of the work on Embedding Problems*", IUCAA, Pune, June 08, 2007.
21. Invited Talk, "*Dark Energy and ISW Effect*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, March 07, 2006.
22. Invited Talk, "*Time-evolution of a three-component FLRW model*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, January 10, 2006.
23. Invited Talk, "*On Some Type of General Relativistic Space-times*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, March 09, 2004.
24. Seminar lecture, "*General Relativity: Why and How*", St. Xavier's College, February 10, 2001.
25. Invited Talk, "*On Conformally Symmetric Space-times*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, July 31, 2001.