



Name: Dr. Sarbari Guha

Department: Physics

Designation: Associate Professor, Head (2007-2010)

Email ID: srayguha@yahoo.com

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 82nd 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

- i. **Visiting Associate of IUCAA** from August, 2006 onwards.
- ii. **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.
- iii. **Post-Doctoral Research Fellow** at the Department of Physics, Queen’s University, Kingston, Ontario, as a member of the research group in **Astronomy, Astrophysics and Relativity**.
- iv. 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.

Professional/Administrative Activities

- ❑ **Head** of the Department of Physics at St. Xavier’s College, Kolkata during 2007-2010.
- ❑ Initiated the publication of the annual departmental magazine **HORIZON** and the annual seminar of the department, **SPECTRUM**. She also initiated the **J. C. Bose Memorial Lecture** at St. Xavier’s College during the 150th birth anniversary of Sir J. C. Bose.
- ❑ **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), 14th November, 2011. Speaker: Professor Sanjeev Dhurandhar.
- ❑ Member, Organizing Committee, **National Seminar on History and Philosophy of Science**, in honor of Late Professor M.C. Chaki’s 99th Birth Anniversary, July 2nd & 3rd, 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 6th 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 90th 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*, in memory of Rev. Father F. Goreux, jointly organized by St. Xavier's College, Birla Planetarium, & Dept. of Pure Mathematics, Calcutta University Nov.12-14, 1992.

Visits Abroad

- ❖ Dr. Guha spent one year as a **Visiting Research Fellow** in the **Department of Physics, Queen's University, Kingston, CANADA**, from October 1, 2004 to September 30, 2005. There she was a member of the research group in **Astronomy, Astrophysics and Relativity**. Some of the problems investigated there includes the representation of the evolution history of many fluid universe models in terms of constants of motion and the spherically symmetric perfect fluid solutions of Einstein field equations.
- ❖ 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.
- ❖ Visited France in August 1996 for one week at the University of Lille.

Invited talks abroad

- ❖ Invited Talk, "*On Some Space-times of General Relativity*", **Department of Physics, Queen's University**, Kingston, Canada, August 06, 2004.
- ❖ Invited Speaker at the **The 6th International Conference of Tensor Society on Differential Geometry & Its Applications**, at Tsukuba, Japan, 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:

Queen's University, Kingston, Ontario, Canada

Research Experience

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

Publications in International peer reviewed Journals: 17

Publications in Conference Proceedings : 29

Examiner of Ph.D. thesis.

Reviewership of Journals

Reviewer of International Journal of Theoretical Physics

Reviewer of Pramana – Journal of Physics

Reviewer of MATHEMATICAL REVIEWS

Details of the Research scholar: As Guide:

Name of the Scholar: Mr. Pinaki Bhattacharya

Registration with University, Status: Jadavpur University, Ph.D. awarded.

Name of Scholar: Md. Inzamul Haque

Registration: Enrolled in St. Xavier's College (Autonomous), Kolkata.

Academic Activities

Resource Person at DST Inspire Science Camp.

Resource Person at the Refresher Course in Physics, Academic Staff College, Calcutta Univ.

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

PREPRINTS AND BACKGROUND PAPERS

1. **Sarbari Guha and Pinaki Bhattacharya**, *Confinement and stability in presence of scalar fields and perturbation in the bulk* ([gr-qc/1412.7832](#)) (communicated)
2. **Sarbari Guha and Pinaki Bhattacharya**, *Five-dimensional gravity with time-dependent warp factor* ([gr-qc/1207.5716](#)) (communicated) **Citation = 01 (Google scholar)**
3. **Sarbari Guha and Pinaki Bhattacharya**, *Models of Gravity in Five-dimensional Warped Product Spacetimes* ([gr-qc/1005.3091](#))
4. **Sarbari Guha**, *Higher-dimensional Embedding of Four-dimensional Hypersurfaces: Chronological Development of Co-dimension-1 Embedding* ([gr-qc/0809.3435](#))

PUBLICATION IN INTERNATIONAL JOURNALS

INTERNATIONAL JOURNALS

1. Pinaki Bhattacharya and **Sarbari Guha**, *Particle Motion and Perturbed Dynamical System in Warped Product Spacetimes*, Int. J. Theor. Phys., 55 (2016) pp. 3375–3392, DOI: 10.1007/s10773-016-2966-2 (2014 Impact Factor: 1.189)

2. **Sarbari Guha** and Ranajoy Banerji, *Dissipative Cylindrical Collapse of Charged Anisotropic Fluid*, Int. J. Theor. Phys., 53 (2014) pp. 2332-2348. DOI 10.1007/s10773-014-2033-9 (2012 Impact Factor: 1.086)
3. **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
4. **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 (2011 Impact Factor: 1.686)
5. **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.
6. 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 (2011 Impact Factor: 1.204)
7. **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 (2011 Impact Factor: 0.845)
8. **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 (2010 Impact Factor: 2.616)
9. **Sarbari Ray-Guha**, *On Perfect Fluid Pseudo Ricci Symmetric Space-time*, TENSOR N.S., Vol. 67, No. 1 (2006), pp. 101-107.
10. **Sarbari Ray-Guha**, *Space-Times admitting vanishing projective curvature tensor*, TENSOR N.S., Vol.65, No.3 (2004), pp. 272-276.
11. **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.
12. **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.
13. 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.
14. **Sarbari Ray-Guha**, *On fluid Pseudo Ricci Symmetric space-time of general relativity*, TENSOR N.S., Vol.63, No. 3 (2002) pp. 252-257.
15. **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.
16. 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.
17. 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.

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.

PAPERS PRESENTED IN CONFERENCES

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

1. **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.
2. **Sarbari Guha**, "*Warped Product Space-Times and Localization of Gravity*", *The 12th 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.
3. **Sarbari Guha**, "*Geometrical dark energy in braneworlds from time-dependent warp factor*" Physical Sciences Section of 100th Indian Science Congress, Kolkata, January 03-07, 2013.
4. **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.
5. 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.
6. **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.
7. **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.
8. **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.
9. **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.
10. 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 90th birth anniversary, M. C. Chaki Centre for Mathematics and Mathematical Sciences, Calcutta, Feb. 5-7, 2003
11. **Sarbari Ray-Guha**, "*On fluid Pseudo Ricci Symmetric space-time of general relativity*," *The 6th International Conference On Differential Geometry and its Applications*, Tensor Society of Japan, Tsukuba, Japan, Aug. 5-9, 2002.
12. **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.
13. **Sarbari Ray**, "*On a type of general relativistic perfect fluid space-time*," *5th International Conference On Differential Geometry and its Applications*, organized by University of Calcutta and Tensor Society of Japan, Calcutta, Dec. 21-25, 1998.

14. **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**, and Ranajoy Banerji, "Study of charged radiating cylindrical collapse of anisotropic fluid with shear", **27th meeting of the IAGRG**, H. N. Bahuguna Garhwal University, Garhwal, Srinagar during March 7-9, 2013.
2. Pinaki Bhattacharya and **Sarbari Guha**, "Time and extra dimension dependent scalar field in the bulk ", **27th meeting of the IAGRG**, H. N. Bahuguna Garhwal University, Garhwal, Srinagar during March 7-9, 2013.
3. **Sarbari Guha**, Pinaki Bhattacharya and Subenoy Chakraborty, "Five-dimensional Warped Product Spacetimes with time-dependent warp factor and cosmology of the braneworld", **26th meeting of the IAGRG**, Harish-Chandra Research Institute, Allahabad, January 19-21, 2011.
4. Pinaki Bhattacharya and **Sarbari Guha**, "Dynamical Characteristics and Geodesic Deviations in Warped Product Space Time", **26th meeting of the IAGRG**, Harish-Chandra Research Institute, Allahabad, January 19-21, 2011.
5. **Sarbari Guha** and Subenoy Chakraborty, "Brane Cosmology and Motion of Test Particles in Five-Dimensional Warped Product Spacetimes," **25th meeting of the IAGRG**, Saha Institute of Nuclear Physics, January 28-31, 2009.
6. **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.
7. **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.
8. **Sarbari Ray**, "On a type of general relativistic perfect fluid space-time," *Proc. 82nd Indian Science Congress*, Part II, **Young Scientist Abstracts**, p.8., 1995.
9. **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.
10. **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.
11. 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.
12. 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.
13. 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.
14. B. Chaki and **Sarbari Ray**, "On some properties of a shear-free perfect flow in a Pseudo Ricci Symmetric Space-time," *Proc. 78th 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. 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.
2. Seminar Lecture, "*A Study of the cylindrical collapse of charged fluid in presence of dissipative effects*", IUCAA, Pune, June 04, 2013.
3. Seminar Lecture, "Five dimensional gravity with time dependent warp factor", Relativity and Cosmology Research Centre, Jadavpur University, September **04, 2012**.
4. 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.
5. Invited Talk, "*Exploring General Relativistic Space-times through the study of geodesics*", IUCAA Reference Centre, Department of Statistics, University of Calcutta, November 14, 2009.
6. Invited Talk, "*The Geometric description of Physics*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, October 20, 2009.
7. Invited Talk, "*On the Embedding of Four-Dimensional Hypersurfaces*" Seminar on the occasion of the 96th Birth Anniversary of Prof. M. C. Chaki, Calcutta Mathematical Society, July 01, 2008.
8. Seminar Lecture, "*A brief review of the work on Embedding Problems*", IUCAA, Pune, June 08, 2007.
9. Invited Talk, "*Dark Energy and ISW Effect*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, March 07, 2006.
10. Invited Talk, "*Time-evolution of a three-component FLRW model*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, January 10, 2006.
11. Invited Talk, "*On Some Type of General Relativistic Space-times*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, March 09, 2004.
12. Seminar lecture, "*General Relativity: Why and How*", St. Xavier's College, February 10, 2001.
13. Invited Talk, "*On Conformally Symmetric Space-times*", Centre for Advanced Studies in General Relativity and Cosmology, Jadavpur University, July 31, 2001.

Conferences / Seminars / Workshops attended during 2004-2014:

1. "Topical Conference on Gravity and Cosmology (Eastern Region)", Saha Institute of Nuclear Physics, Kolkata, December 13, 2013.
2. Seminar on "*Recent Aspects of Gravitation and Cosmology*" Department of Physics, Jadavpur University, March 20, 2012.
3. National Seminar on "*History and Philosophy of Science*", M. C. Chaki Centre for Mathematics and Mathematical Sciences, July 2-3, 2011.
4. Seminar on "*Emerging Trends in Gravitation and Cosmology*", Department of Physics, Jadavpur University, March 15, 2011.
5. Seminar on "*Contemporary Issues in Astrophysics and Cosmology*", Department of Physics, Jadavpur University, March 23, 2010.

6. Workshop on Astrophysics and Cosmology, Department of Applied Mathematics, Calcutta University, January 13-14, 2010.
7. National Workshop on "Undergraduate Physics Teaching", Behala College, February 8-10, 2008.
8. National Seminar-cum-Workshop "Evaluation System at Under Graduate Level", St. Xavier's College, Kolkata, April 1-2, 2007.
9. National Workshop on "Sun and Stars", St. Xavier's College, November 21-23, 2005.
10. National Seminar-2004, Department of Mathematics, University of Kalyani, February 13-14, 2004.