

CURRICULUM VITAE

Name : SUDIPTA DAS

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Date of Joining Visva-Bharati: 10.08.2009

Educational Qualification :

Ph. D. in Physics (2008) from Jadavpur University, Kolkata
Masters in Computer Application (2004) from IGNOU
M.Sc. in Physics (2000) from Jadavpur University, Kolkata
B.Sc. in Physics (1997) from Cotton College, Gauhati University

Title of the thesis : Aspects of Quintessence Matter – The Driver of the Late Time Acceleration of the Universe.

Field of Research : Cosmology and Gravitation (Theory).

Current Status : Assistant Professor in Physics (Stage –III), Visva-Bharati, Santiniketan,
West Bengal, India.



• Awards / Prizes / Other Recognitions:

1. Awarded the National Scholarship on the basis of performance in the High School Leaving Certificate examination 1992.
2. Awarded the National Scholarship on the basis of performance in the Higher Secondary examination 1994.
3. Awarded the CSIR Research Fellowship in India in 2007.
4. Awarded third prize in Young Physicists' Colloquium, 2007 organized by Indian Physical Society.
5. Awarded CSIR Research Associate Fellowship in India in 2008.
6. Won the V. V. Narlikar Best Thesis Award Competition organized by Indian Association for General Relativity and Gravitation (IAGRG) in 2009.
7. Research Associateship of the Inter University Centre for Astronomy and Astrophysics, Pune, India since 2011.
8. Editorial Board Member of the journal Current Indian Science (Field: Astronomy and Astrophysics), 2021

• Association with professional bodies :

- (i) Life member of Indian Physical Society, Kolkata, India.
- (ii) Life member of Indian Association of General Relativity and Gravitation (IAGRG), Pune, India.
- (iii) Life member of Astronomical Society of India.

• Sponsored Research Projects :

“Study of scalar perturbations in cosmological models of Dark Energy”

Sponsored by Science and Engineering Research Board (SERB), New Delhi

Sanction No. : EMR/2016/007162 dated 13th July, 2017

Duration: 02-08-2017 to 01-02-2021

Sanctioned amount: INR 17,54,060/-

• Research students supervised :

1. Dr. Abdulla Al Mamon (Awarded Ph.D. degree in 2016)
2. Ms. Manisha Banerjee (Currently working)
3. Ms. Sangita Goswami (Currently working)
4. Ms. Priyanka Adhikary (Currently working)

• **List of Publications :**

1. **Acceleration of the universe with a simple trigonometric potential.**
Narayan Banerjee, Sudipta Das;
Gen. Relativ. Gravit., **37**, 1695 (2005).
arxiv : astro-ph/0505121
2. **An interacting scalar field and recent cosmic acceleration.**
Sudipta Das, Narayan Banerjee;
Gen. Relativ. Gravit., **38**, 785 (2006).
arxiv : gr-qc/0507115.
3. **Curvature driven acceleration: a utopia or a reality?**
Sudipta Das, Narayan Banerjee, Naresh Dadhich;
Class. Quantum Grav., **23**, 4159 (2006).
arxiv : astro-ph/0505096.
4. **Spintessence: a possible candidate as a driver of the late time cosmic acceleration.**
Narayan Banerjee, Sudipta Das;
Astrophys. Space Sci., **305**, 25 (2006).
arxiv : gr-qc/0512036.
5. **A late time acceleration of the universe with two scalar fields: many possibilities.**
Narayan Banerjee, Sudipta Das
Mod. Phys. Letts. A , **35**, 2663 (2006).
arxiv : gr-qc/0605110.
6. **Brans Dicke Scalar Field as a Chameleon.**
Sudipta Das, Narayan Banerjee
Phys.Rev.D, **78**, 043512 (2008) .
7. **Non-minimal quintessence with nearly flat potential .**
Anjan Ananda Sen, Gaveshna Gupta, Sudipta Das
JCAP, **09**, 027 (2009).
8. **Chameleon field and the late time acceleration of the universe.**
Narayan Banerjee, Sudipta Das, Koyel Ganguly
Pramana, **74**, L481 (2010).
9. **Can Neutrino Viscosity Drive the Late Time Cosmic Acceleration?**
Sudipta Das · Narayan Banerjee
Int. J. Theor. Phys. **51** , 2771 (2012).
10. **An Interacting model of Dark Energy in Brans-Dicke theory**
Sudipta Das, Abdulla Al Mamon
Astrophys. Space Sci ., **351**, 651(2014).
11. **Cosmic acceleration in non-canonical scalar field model: an interacting scenario**
Sudipta Das, Abdulla Al Mamon
Astrophys. Space Sci., **355**, 371 (2015).

12. **Study of non-canonical scalar field model using various parametrizations of dark energy equation of state**
Abdulla Al Mamon, Sudipta Das
The European Physical Journal C, **75**, 244 (2015).
13. **Generalized Second Law of Thermodynamics for Non-canonical Scalar Field Model with Corrected-Entropy**
Sudipta Das, Ujjal Debnath, Abdulla Al Mamon
The European Physical Journal C, **75**, 504 (2015).
14. **Study of parametrized dark energy models with a general non-canonical scalar field**
Abdulla Al Mamon, Sudipta Das
The European Physical Journal C, **76**, 135 (2016).
15. **A divergence free parametrization of deceleration parameter for scalar field dark energy**
Abdulla Al Mamon, Sudipta Das
Int. Journal of Modern Physics D, **25**, 1650032 (2016).
16. **Constraints on reconstructed dark energy model from SN Ia and BAO/CMB observations**
Abdulla Al Mamon, Kazuharu Bamba, Sudipta Das
The European Physical Journal C **77**, No.1, 29 (2017).
17. **A parametric reconstruction of the deceleration parameter**
Abdulla Al Mamon, Sudipta Das
The European Physical Journal C, **77**, No. 7, 495 (2017).
18. **A new parametrization of dark energy equation of state leading to double exponential potential**
Sudipta Das, Abdulla Al Mamon and Manisha Banerjee
Research in Astronomy and Astrophysics (RAA), no.11, **131**,18 (2018)
19. **Dynamical System Analysis for Steep Potentials**
Sudipta Das, Manisha Banerjee, Nandan Roy
JCAP, **024**, 1908 (2019)
20. **Growth of Perturbations using Lambert W Equation of State**
Manisha Banerjee, Sudipta Das, Abdulla Al Mamon, Subhajit Saha, Kazuharu Bamba
International Journal of Geometric Methods in Modern Physics, 2150139 (2021)
21. **Barrow holographic dark energy in a nonflat universe**
Priyanka Adhikary, Sudipta Das, Spyros Basilakos and Emmanuel N. Saridakis
PHYSICAL REVIEW D **104**, 123519 (2021)
22. **Quintessence or phantom: Study of scalar field dark energy models through a general parametrization of the Hubble parameter**
Nandan Roy, Sangita Goswami and Sudipta Das
Physics of the Dark Universe **36**, 101037 (2022)

• Publications in Conference proceedings :

1. A Non-minimal quintessence model of dark energy.

Sudipta Das

Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity (Page No. - 1268)

World Scientific, Singapore, 2012.

2. Two Fluid Model of Dark Energy

Abdulla Al Mamon, Sudipta Das

Proceedings of the National Conference on Mathematical Trends in Physical Sciences (NCMTPS -2014)

ISBN:978-981-09-1667-1

Publisher: Research Publishing Services

• Research Interest:

I am interested in Gravitation and Cosmology in general. This is a rapidly developing area of research which brings together the aspects of general relativity, the concepts of particle physics and the techniques of astronomy. The new coming and ever-improving astronomical data has given solid observational support to the standard big bang model, while new ideas from particle physics continue to provide theoretical challenges.

The recent advances in observational cosmology has led to many exciting discoveries and possibilities regarding the evolution of the universe, but arguably the most exciting and puzzling amongst them is that the universe at present is undergoing an accelerated expansion. The search for the matter, popularly referred to as “Dark Energy” or “Quintessence Matter”, responsible for this unexpected behaviour of the universe provides one of the greatest excitements in the contemporary theoretical physics. My thesis work was focussed on the problem of “dark energy”, where it has been tried to model the universe such that the alleged late time acceleration of the universe is preceded by a decelerated phase of expansion. This is crucial so that successful nucleosynthesis in the radiation dominated era and the large scale structure formation in the matter dominated regime could proceed unhindered and make the universe look the place where we live in now. I have applied both minimally and non minimally coupled scalar fields as the “dark energy” which might be able to drive this transition from deceleration to acceleration. I have also worked with the possibility of a curvature driven acceleration, where inverse powers of the Ricci scalar, which dominates the dynamics during the later phase of the expansion, generates this acceleration.

At present I am also trying to understand the origin and evolution of perturbations in the inflationary scenario. Inflationary cosmology proposes that the universe underwent a period of rapid near-exponential expansion at very early times. These perturbations are generally induced by the quantum fluctuations of the scalar field which drives inflation. These fluctuations seem to be responsible for the origin of the present large scale structures in the Universe. The recent WMAP data seems to confirm the presence of some large scale features in the angular power spectrum of Cosmic Microwave Background Radiation (CMB). Currently, I am interested to construct various inflationary scenarios which can generate features in the primordial spectrum and to study their imprints on the CMB. Since slow-roll evolution predicts a scale-invariant power spectrum of fluctuations, one has to go away from slow roll conditions in order to generate features in the power spectrum. Apart from looking at the conventional models of inflation in which inflation is driven by a canonical single scalar field, I am also looking at non-canonical scalar field models, say, DBI field, which generically arise in the context of string theory.

• Conference Presentations :

1. Acceleration of the universe with a simple trigonometric potential – delivered in the 23rd IAGRG conference held at University of Rajasthan, Jaipur (December 2004).
2. A late time acceleration of the universe with two scalar fields : Many possibilities – Delivered in the Young Astronomers' meet 2005 held at IUCAA, Pune (November 2005).
3. Acceleration of the universe : a utopia or a reality? – delivered at the 24th IAGRG conference held at Jamia Milia Islamia, New Delhi (February 2007).
4. Acceleration of the universe : a utopia or a reality? – delivered at the 25th YPC Colloquium held at Saha Institute of Nuclear Physics, Kolkata (August 2007).
5. Presented a paper at International conference on Gravitation and Cosmology (ICGC 2007) held at IUCAA, Pune (December 2007).
6. Presented a paper at Invisible Universe International Conference held at Palais de l'UNESCO, Paris, France (June 2009).
7. Presented a paper at the Twelfth Marcel Grossmann Meeting on General Relativity held at Palais de l'UNESCO, Paris, France (July 2009).
8. Presented a paper at the International Conference on Modern Perspectives of Cosmology and Gravitation held at Indian Statistical Institute, Kolkata (February 2012).
9. Presented a paper at the 27th Meeting of Indian Association for General Relativity and Gravitation held at HNBahuguna Garhwal University, Srinagar, Garhwal (March, 2013)
10. Presented a paper at the Saha Theory Workshop : Cosmology at the Interface held at Saha Institute of Nuclear Physics, Kolkata (28 – 30 January, 2015)
11. International conference 29th IAGRG meeting held at IIT Guwahati during 18th-20th May, 2017.
12. Delivered an invited talk at National Level Workshop Entitled "Celebrating the Centenary of Einstein's General Relativity : Hundred Years with ' Λ ' (CCEGR-2017)" held at University of Burdwan on 26th July, 2017.
13. Delivered an invited talk at Department of Physics, Maulana Azad College, Kolkata on 12th September, 2017.
14. Presented a paper at the 30th Meeting of Indian Association for General Relativity and Gravitation held at BITS-Pilani Hyderabad Campus during January 3-5, 2019
15. Presented a paper at the 5th Tah Poe School on Cosmology held at Naresuan University, Pitsanulok, Thailand during July 22-29, 2019
16. Presented a paper at the International Conference on Gravitation & Cosmology 2019 held at IISER

Mohali during December 10-13, 2019

17. Presented a paper at the International Conference on Emergent Issues in Cosmology and Particle Physics (EICP2) held at Visva-Bharati, Santiniketan during January 12-14, 2020
18. Delivered an invited talk at the National Webinar on “Dark energy and dark matter: Mysteries of the Universe”, organized by Department of Physics, Seth Phoolchand Agrawal Smriti Mahavidyalaya, Nawapara- Rajim, Raipur on 23 rd July, 2020
19. Delivered an invited talk at the National Webinar on “Recent Advances In Physics Research”, jointly Organized by Department of Physics, GDC, Dharmanagar, North Tripura and Women’s College, Agartala, West Tripura on 12 th August 2020
20. Presented a paper at the National Seminar on Recent Advances in Astrophysics and Cosmology held at North Bengal University during March 24-25, 2021
21. Presented a paper at the International Conference “Cosmology from Home 2022” held in online mode during July 4-15, 2022
22. Delivered an invited talk at the Cosmology Group Meet at Department of Physics, IIT Madras on October 22, 2022.

• **Summer school / Refresher/ Orientation course/ Conferences /Workshops attended :**

1. The [SERC Preparatory School](#) in Theoretical High Energy Physics at Utkal University, Bhubneswar during Feb 3-21, 2003. The school was sponsored by Department of Science and Technology, Govt. of India.
2. The [SERC Main School](#) in Theoretical High Energy Physics at Jaipur University, Jaipur during Feb 7-25, 2005. The school was sponsored by Department of Science and Technology, Govt. of India.
3. The 23rd IAGRG conference held at University of Rajasthan, Jaipur during Dec 12- Dec 16, 2005).
4. The [Young Astronomers' Meet \(YAM\) 2005](#) at IUCAA, Pune during Nov 29-Dec 02, 2005. The meeting was jointly organized by IUCAA and NCRA.
5. An international conference on [Einstein's Legacy in the New Millennium](#) at Toshali Sands, Puri, India during Dec 15-22, 2005. The conference was jointly organised by IUCAA-Pune, IOP-Bhubaneswar and Dept. of Physics, Utkal University, Bhubaneswar.
6. A [School on Cosmology and the Very Early Universe](#) at IUCAA, Pune during Dec 25-30, 2005. The school was dedicated to the memory of Late Prof. A. K. Raychaudhuri.

7. The [24th IAGRG meeting on Recent Advances in Gravitation and Cosmology](#) during Feb 5-8, 2007 at Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi.
8. The [6th International Conference on Gravitation and Cosmology \(ICGC\)](#) during Dec 17-21, 2007 at [IUCAA, Pune](#).
9. Workshop on Physics of Warped Extra Dimensions during Feb 21 – 23, 2008 at Centre for Theoretical Studies, IIT Kharagpur.
10. [ICTP Summer School in Cosmology](#) during July 21-Aug 1, 2008 at The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy.
11. [Cosmology with CMB and LSS: Link to Early Universe](#) during Aug 18-Aug 31, 2008 at IUCAA, Pune.
12. Invisible Universe International Conference held at Palais de l'UNESCO, Paris, France (29 June - 3rd July, 2009).
13. Workshop on Eternal Inflation during 8 – 12 June, 2009 at The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy.
14. Twelfth Marcel Grossmann Meeting on General Relativity held at Palais de l'UNESCO, Paris, France (14-18 July, 2009).
15. Workshop on Astrophysics and Cosmology during January 13 -14, 2010 held at Department of Applied Mathematics, University of Calcutta.
16. Seminar on Emerging Trends in Gravitation and Cosmology held at Jadavpur University, Kolkata on 15th March, 2011.
17. The [7th International Conference on Gravitation and Cosmology \(ICGC\)](#) during Dec 14-19, 2011 at Goa.
18. International conference on Modern Perspectives of Cosmology and Gravitation (COSGRAV12) held at Indian statistical Institute, Kolkata from 07-11 February, 2012.
19. Seminar on Recent Aspects of Gravitation and Cosmology held at Jadavpur University, Kolkata on 20th March, 2012.
20. XX DAE-BRNS High Energy Physics Symposium held at Visva-Bharati, Santiniketan during 13-18 January, 2013.
21. 27th Meeting of Indian Association for General Relativity and Gravitation held at H N Bahuguna Garhwal University, Srinagar, Garhwal (7 – 9 March, 2013).
22. First Topical Conference on Gravity and Cosmology (Eastern Region) held at Saha Institute of Nuclear Physics, Kolkata on 13th December, 2013.
23. National Conference on Current Trends in Particle Physics Research (CTPPR2014) held at the Department of Physics, University of Kalyani during March 13-15, 2014.
24. 2nd Topical Conference on Gravity and Cosmology (Eastern Region) held at Presidency University, Kolkata on 9th August, 2014.
25. National Conference on Mathematical trends in Physical Sciences (NCMPTS 2014) held at Heritage Institute of Technology, Kolkata during 13-14 August, 2014.
26. Workshop on Observational aspects of Astrophysics and Cosmology held at Visva-Bharati,

Santiniketan during 3-4 November, 2014.

27. Saha Theory Workshop : Cosmology at the Interface held at Saha Institute of Nuclear Physics, Kolkata (28 – 30 January, 2015)
28. TCGCA-ER4 Meeting : Topical Conference on Gravity, Cosmology, Astronomy and Astrophysics (Eastern Region) held at IISER- Kolkata on September 19, 2015.
29. TCGCA-ER5 Meeting held at Indian Statistical Institute, Kolkata on March 19, 2016.
30. TCGCA-ER6 held at Visva-Bharati, Santiniketan on September 24, 2016.
31. III Saha Theory Workshop: Aspects of Early Universe Cosmology held at Saha Institute of Nuclear Physics, Kolkata (16 – 20 January, 2017).
32. National level workshop on Developing Astronomy Themed Experiments held at IUCAA, Pune during June 18-20, 2018
33. International Workshop on Emerging Trends in Gravitation and Cosmology held in online mode organized by the Department of Mathematics, Presidency University, Kolkata, India during December 16-19, 2021.
34. Short online course on Fundamentals of astronomy using Stellarium organized by the Teaching Learning Center (TLC) of IUCAA, Pune held during August 8 – 26, 2022.
35. International workshop on Galaxy Formation and Evolution Across the Cosmic Time (GFEACT-2022) held at Visva-Bharati, Santiniketan during December 13-14, 2022.
36. 32nd meeting of Indian Association for General Relativity and Gravitation (IAGRG) held at IISER-Kolkata during 19-21 December, 2022.

I do hereby declare that the information given here are true to the best of my knowledge and belief.

(SUDIPTA DAS)