

Anirban ROY

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PERSONAL DATA

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Citizenship: Indian
Date of Birth: March 17, 1993

EDUCATION

- NOV 2016- PRESENT | *PhD student in Astrophysics*
SISSA/ ISAS- International School for Advanced Studies
Supervisors: Carlo Baccigalupi (SISSA), Andrea Lapi (SISSA), David Spergel (Princeton)
- NOV 2015- OCT 2016 | *PhD Coursework*
Credits awarded on the topics of introduction to cosmology, cosmic microwave background, general theory of relativity, large scale structure formation, stellar structure and evolution, dark matter and dark energy, radiative process in astrophysics and computational astrophysics.
- SEP 2013- AUG 2015 | *Master Degree in Physics*
University of Burdwan, Burdwan, India
Master Thesis: Secondary Anisotropies in Cosmic Microwave Background
Supervisor: Sarbeswar Chaudhuri
- AUG 2010- JUL 2013 | *Bachelor Degree in Physics*
University of Calcutta, Kolkata, India
Project Title: Astrophysical Data Analysis Using Virtual Observatory Tools

WORK EXPERIENCE

- MAY 2018- AUG 2018 | *Visiting Student*
Kavli Institute for Cosmology, University of Cambridge, UK
Project Title: The study of B-mode signal from patchy reionization and contamination on primordial B mode spectra
Collaborators: Girish Kulkarni, Daan Meerburg, Anthony Challinor, Martin Haehnelt
- JAN 2014- MAY 2015 | *Project Student*
Presidency University, India
Project Title: Modelling Sunyaev Zeldovich Effect in Active Galaxies
Supervisor: Suchetana Chatterjee

RESEARCH INTEREST

Cosmic Microwave Background (CMB): Secondary Anisotropies in CMB by Lensing, Reionization and Sunyaev-Zeldovich Effect, imprints of non-Gaussianity in CMB, Cross correlation studies with multiple tracers.

Interface of Astrophysics and Cosmology: Redshifted 21-cm signal, Active Galactic Nuclei Feedback, Star Formation History in High Redshift Galaxies.

Foreground Cleaning: Modelling the emission of Galactic Dust and synchrotron, Component Separation.

PUBLICATIONS/ PREPRINTS

Major Contribution:

- 1) "Observing Patchy Reionization With Future CMB Polarization Experiments", **Anirban Roy**, Andrea Lapi, David Spergel, Carlo Baccigalupi, 2018, JCAP, 5, 014 [[arXiv:1801.02393](https://arxiv.org/abs/1801.02393)]
- 2) "Beyond Λ CDM with Low and High Redshift Data: Implications for Dark Energy", Koushik Dutta, **Anirban Roy**, Ruchika, Anjan A. Sen, M.M. Sheikh-Jabbari, 2019, Submitted in MNRS, [[arXiv:1808.06623](https://arxiv.org/abs/1808.06623)]
- 3) "The Simons Observatory: Science goals and forecasts", Peter Ade et. al, including Anirban Roy, 2019, JCAP, 56, [[arXiv:1808.07445](https://arxiv.org/abs/1808.07445)]
- 4) "Detectability of the $\tau - 21cm$ cross-correlation: a tomographic probe of patchy reionization", **Anirban Roy**, Andrea Lapi, David Spergel, Carlo Baccigalupi, **submitted in JCAP**, [[arXiv:1904.02637](https://arxiv.org/abs/1904.02637)]
- 5) "*B*-mode CMB polarisation from patchy reionization in models calibrated to Lyman- α data", **Anirban Roy**, Girish Kulkarni, Daan Meerburg, Anthony Challinor, Martin Haehnelt, Carlo Baccigalupi, Andrea Lapi, **In Preparation, expected submission in August, 2019**
- 6) "CMB-S4 Science Case, Reference Design, and Project Plan", Kevork Abazajian et. al, including Anirban Roy, July, 2019, [[arXiv:1907.04473](https://arxiv.org/abs/1907.04473)]

PROCEEDINGS

- 1) "Unique Probes of Reionization with the CMB: From the First Stars to Fundamental Physics", Marcelo Alvarez, Cora Dvorkin, James Aguirre, Nicholas Battaglia, Tzu-Ching Chang, Simone Ferraro, Will Handley, Chen Heinrich, Chang Feng, Colin Hill, Renee Hlozek, Gil Holder, Lloyd Knox, Kiyoshi Masui, Suvodeep Mukherjee, **Anirban Roy**, Emmanuel Schaan, Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 482 (2019)

AWARDS

NOV 2015-OCT 2019	PhD Fellowship in Astrophysics Division, SISSA, Italy
OCT 2015-NOV 2015	Postgraduate Fellowship in Astrophysics Division, SISSA, Italy
15TH MARCH 2015	1st Prize in Poster Presentation in Westbengal Science and Technology Congress, Burdwan, India
OCTOBER 2010	Gold Medal for excellent result in high school final by Contai municipality, Contai, India

COLLABORATION

Simons Observatory: SZ and cluster group, Lensing working group

CMB S4: Galaxy formation and evolution group

CMB Bharat (An India based space CMB mission): Reionization, Lensing working group

COMPUTER SKILLS

PROGRAMMING LANGUAGES	Python, C
SCIENTIFIC PACKAGES	CLASS, Monte Python, CosmoMC, CAMB, HEALPY, Lenspix, Quicklens, LensIt, CMB4CAST, Cosmology, 21cmFAST, 21cmSense, Picola, Pylians
DEVELOPED PACKAGE	Tauspec (Available soon)
SIMULATION	Worked on Sherwood simulation suite (https://www.nottingham.ac.uk/astronomy/sherwood/)
OS & OTHERS	Windows, Linux, Mac, LaTeX

CONFERENCE/WORKSHOP/SCHOOL/ VISIT

JUNE 2019	"Quantum to Cosmos", Tubitak Tusside, Gebze, Turkey.
MARCH 2019	Scientific Collaboration, NASA Jet Propulsion Laboratory, Pasadena, USA.
JUNE 2018	CMB S4 Collaboration Meeting, Fermilab, Chicago, USA.
AUGUST 2018	Academic visit and CMB S4 collaboration meeting, Princeton University, Princeton, USA.
JUNE 2018	Simons Observatory Collaboration Meeting, University of Pennsylvania, Philadelphia, USA.
MARCH 2018	Academic Visit, Center for Computational Astrophysics, New York, USA.
OCT 2017	Post Planck Cosmology-Enigma, Challenges and Visions, IUCAA, Pune, India.
SEP 2017	Astro-Trieste conference, SISSA, Trieste, Italy.
JUL 2017	Probing the space-time fabric: from concepts to phenomenology, SISSA, Trieste, Italy.
JAN 2017	III Saha Theory Workshop: Aspects of Early Universe Cosmology, SINP, Kolkata, India.
DEC 2016	Academic Visit, Tata Institute of Fundamental Research, Mumbai, India.
JUN 2016	Summer School in Cosmology, ICTP, Trieste, Italy.
NOV 2014	"Observational Aspects of Astrophysics and Cosmology", Visva Bharati University, Shantiniketan, India.
AUG 2014	"Topical Conference on Gravity and Cosmology", Presidency University, Kolkata, India.
FEB 2013	"Workshop on Solar Physics, Vivekananda University, Belur, India.
DEC 2012	"Virtual Observatory In Astrophysics", University of Calcutta, Kolkata, India.

TALKS

- INVITED “Patchy Reionization and induced B -mode signal”,
Conference Speaker, Tor Vergata, Rome, Italy, May 30, 2019
- CONTRIBUTED “ B -mode signal from patchy reionization”,
Conference Speaker, ICTS, Bangalore, India, January 24, 2019
- INVITED “Probing the new physics with future CMB experiments”,
Seminar Speaker, Jamia Millia Islamia, New Delhi, India, December 20, 2018
- CONTRIBUTED “Do we need to worry about patchy reionization?”,
Fire slide, Simons Observatory Collaboration meeting, Upenn, USA, June 18, 2018
- INVITED “Probing the reionization with Cosmic Microwave Background”,
Seminar Speaker (Remote), IIT-Indore, Indore, India, May 14, 2018
- INVITED “Precision Cosmology with the baby picture of the Universe”,
Seminar speaker, Akdeniz University, Turkey, March 13, 2018
- “INVITED “Precision Cosmology with the baby picture of the Universe”,
Seminar speaker, Istanbul University, Turkey, March 12, 2018
- “INVITED “Cosmic Reionization: What can future CMB experiments tell us?”,
Seminar speaker, SINP, Kolkata, India, October 10, 2017
- INVITED “Cosmic Reionization: What can future CMB experiments tell us?”,
Seminar speaker, Challenges and Visions, IISER, Kolkata, India, October 13, 2017
- CONTRIBUTED “Observing Patchy Reionization with Future CMB Polarization Experiments”,
Post Planck Cosmology-Enigma, Challenges and Visions, IUCAA, Pune, India, October 10, 2017
- CONTRIBUTED “Observing Patchy Reionization with CMB S4”,
Astro-Trieste Conference, SISSA, Trieste, Italy, September 26, 2017
- CONTRIBUTED “Effects of inhomogeneous reionization on CMB anisotropy”,
III Saha Theory Workshop: Aspects of Early Universe Cosmology,
Saha Institute of Nuclear Physics, Kolkata, India, January 16, 2017
- INVITED “Our Universe: Through The Eyes of A Cosmic Detective”,
“Challenges in Modern Cosmology”, Seminar Speaker,
University of Dhaka, Dhaka, Bangladesh, January 7, 2016,

OTHER ACADEMIC INTERESTS

I am very interested to work actively on Science popularization among school and undergraduate students as well as to the general public, particularly from the developing countries. I was the founder member of ISAAC (Independent Students' Association For Astrophysics and Cosmology) which works to popularize astronomy among the students in India. I took interviews of some renowned astrophysicists like Sir Martin Rees (Cambridge), Robert Brandenberger (Mcgill), Sera Markoff (API, Amsterdam), Huub Rottgering (Leiden), Florence Durret (IAP, France), Gary Mamon (IAP, France), Veronique Buat (LAM, France) and others.

LANGUAGES

Bengali (Mother tongue), English (Fluent), Hindi (Fluent), Italian (Basic knowledge), Turkish (Basic knowledge),

REFERENCES

- CARLO BACCIGALUPI | *Full Professor, Astrophysics Division*
SISSA/ ISAS- International School for Advanced Studies
E-mail: bacci@sisssa.it
Homepage: <http://www.people.sisssa.it/~bacci>
- DAVID SPERGEL | *Charles Young Professor of Astronomy, Princeton University*
Founding Director, CCA, Flatiron Institute
E-mail: dns@astro.princeton.edu
Homepage: <http://www.astro.princeton.edu/~dns>
- ANDREA LAPI | *Associate Professor, Astrophysics Division*
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- GIRISH KULKARNI | *Assistant Professor, Department of Physics*
Tata Institute Of Fundamental Research (TIFR)
E-mail: kulkarni@theory.tifr.res.in
- ANTHONY CHALLINOR | *Professor, University of Cambridge*
Deputy Director, IoA and Kavli Institute for Cosmology, Cambridge
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