

P. Jishnu Sai

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Education

- 2019 – Present **Indian Institute of Science** – Bangalore, India
PhD in Physics
Mentor: Dr. Rajeev Kumar Jain
- 2017 – 2019 **Indian Institute of Science** – Bangalore, India
MSc in Physical Science
CGPA: 7.5/10
- 2014 – 2017 **University of Calicut** – Calicut, India
Government College Madappady, Vadakara
BSc in Physics
CGPA: 4.8/6

Research experience

- January 2019 – August 2019 **Cosmological Consistency Relations and δN formalism (Master Project)**
Mentor: Dr. Rajeev Kumar Jain
Astronomy and Astrophysics Group, Indian Institute of Science, Bangalore, India.
- June 2018 – July 2018 **Research Intern, Project title: Numerical study on the predictions of extranatural inflation at reheating epoch**
Mentor: Dr. Gaurav Goswami
Theoretical Physics Group, School of Engineering and Applied Science, Ahmedabad University, Ahmedabad, India
- May 2018 – June 2018 **Summer Project**
Mentor: Prof. Diptiman Sen
Center for High Energy Physics, Indian Institute of Science, Bangalore, India.
- April 2018 – June 2018 **Summer Project**
Mentor: Dr. Rajeev Kumar Jain
Astronomy and Astrophysics Group, Indian Institute of Science, Bangalore, India.

Research Interests

Inflation and alternatives, Primordial non-Gaussianity, Cosmological correlators, Cosmological Bootstrap, Cosmological Collider, Primordial magnetic fields, Cosmic microwave background, Cosmological soft theorems, Quantum field theory in curved spacetime, Cosmological Backreaction, δN formalism, Primordial Blackholes, IR effects in de Sitter, quantum loop effects in the early universe.

Technical skills

Programming languages

Proficient in: C, C++, Python

Software LaTeX, Mathematica, Origin

Teaching experience

January 2021 – May 2021	Teaching assistant, PH371: General Relativity and Cosmology (IISc)
January 2020 – May 2020	Teaching assistant, UP102: Introduction to Electromagnetic Theory (IISc)

Honors and scholarships

2022	Special mention in poster presentation (Department Inhouse Symposium, Department of Physics, Indian Institute of Science, Bangalore, India)
2021	Best teaching assistant award for the academic year 2020-21 (Department of Physics, Indian Institute of Science, Bangalore, India)
2017	Qualified Joint CSIR-UGC Junior Research Fellowship (JRF) and National Eligibility Test (NET) for lecturership conducted by Government of India
2017	Selected for the Integrated PhD Program in Physical Sciences at Indian Institute of Science
2017	Qualified Joint Admission Test for M.Sc (JAM) conducted by Government of India
2010	INSPIRE Award, Department of Science Technology, Government of India

Publications/Preprints

2024	Backreactions effects of Enhanced Power in Ultra Slow-roll Inflation Rathul Nath Raveedran, P. Jishnu Sai and Rajeev Kumar Jain (in preparation)
2024	Parity-violating bispectrum of graviton with gauge fields P. Jishnu Sai and Rajeev Kumar Jain arXiv:2412.XXXX [hep-th]
2024	Super-Hubble Evolution of the Scalar-Magnetic Bispectrum During Inflation and Reheating P. Jishnu Sai, Suvashis Maity, L. Sriramkumar and Rajeev Kumar Jain, arXiv:2412.XXXX [hep-th]
2023	Inflationary cross-correlations of a non-minimal spectator and their soft limits P. Jishnu Sai and Rajeev Kumar Jain JCAP09 (2023) 043
2022	On the primordial correlation of gravitons with gauge fields Rajeev Kumar Jain, P. Jishnu Sai, and Martin S. Sloth, JCAP 03 (2022) 054

Conferences/Workshops attended

September 2023	[Talk] 26th International Conference on Particle Physics and Cosmology(COSMO'23) <i>Instituto de Física Teórica (IFT UAM-CSIC) in Madrid, Spain.</i>
January 2023	[Poser presentation] Department Inhouse Symposium <i>Indian Institute of Science, Bangalore, India</i>
December 2022	[Talk] Aspects of Cosmology Half-a-day meeting @ IIT Madras <i>Indian Institute of Technology Madras, India</i>
December 2022	[Poser presentation + Flash talk] 32nd meeting of Indian Association for General Relativity and Gravitation (IAGRG32) <i>Indian Institutes of Science Education and Research, Kolkata, India</i>
November 2022	Discussion meeting on Particle Physics: Phenomena, Puzzles, Promises <i>International Centre for Theoretical Sciences, Bangalore, India</i>

September 2022	[As a panelist for the cosmological bootstrap discussion session] A Cosmic Window to Fundamental Physics: Primordial Non-Gaussianity and Beyond <i>Instituto de Física Teórica (IFT, CSIC-UAM), Madrid</i>
July 2022	Summer School on Cosmology 2022, An ICTP Hybrid Meeting <i>The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy (Online)</i>
March 2022	[Poser presentation] The 40th Meeting of the Astronomical Society of India (ASI) <i>Indian Institute of Technology, Roorkee, India</i>
February 2022	YKIS2022a "Gravity - The Next Generation-" (Yukawa International Seminar 2022a) <i>Yukawa Institute for Theoretical Physics, Kyoto University (Online)</i>
February 2022	Second Chennai Symposium on Gravitation and Cosmology <i>Department of Physics, Indian Institute of Technology, Madras (Online)</i>
January 2022	[Poser presentation] Department Inhouse Symposium <i>Indian Institute of Science, Bangalore, India</i>
January 2022	School on Physics of the Early Universe <i>International Centre for Theoretical Sciences, Bangalore, India</i>
December 2021	[Oral presentation] The 30th Workshop on General Relativity and Gravitation in Japan (JGRG30)(Online)
November 2021	Conference on Applications of Quantum Information in QFT and Cosmology <i>The University of Lethbridge (Online)</i>
October 2021	A Discussion on the Cosmological Principle <i>Asia Pacific Center for Theoretical Physics, Pohang, South Korea (Online)</i>
September 2021	Black Holes Inside and Out (Online Conference) <i>Tokyo Institute of Technology, Florida Space Institute and YITP, Kyoto University</i>
August 2021	[Poser presentation] The 24th International Conference on Particle Physics and Cosmology (COSMO'21) <i>University of Illinois (Online)</i>
December 2020	31st meeting of the Indian Association for General Relativity and Gravitation <i>Indian Institute of Technology, Gandhinagar, India (Online)</i>
November 2020	Less Travelled Path of Dark Matter: Axions and Primordial Blackholes (Workshop) <i>International Centre for Theoretical Sciences, Bangalore, India (Online)</i>
September 2020	Physics of the Early Universe - An Online Precursor <i>International Centre for Theoretical Sciences, Bangalore, India (Online)</i>
December 2019	[Oral presentation] International Conference on Gravitation and Cosmology <i>Indian Institute of Science Education and Research, Mohali, India</i>

Invited talks/Seminars

22 Nov. 2023	Online Cosmology Journal club, Padova Cosmology Group, Università degli Studi di Padova, Padova, Italy, (Online) <i>Inflationary Cross-Correlations of Non-minimal Spectators and Their Soft Limits</i>
29 Sept. 2023	Institute for Fundamental Physics of the Universe, Trieste, Italy <i>Inflationary Cross-Correlations of Non-minimal Spectators and Their Soft Limits</i>
26 Sept. 2023	Scuola Normale Superiore di Pisa, Pisa, Italy <i>Non-Gaussianities from spectator fields and the related violation of consistency relations</i>
25 Sept. 2023	Laboratoire de Physique de l'Ecole Normale Supérieure, Paris, France <i>Non-Gaussianities from spectator fields and the related violation of consistency relations</i>

- 22 Sept. 2023 **Department of Physics, University of Jyväskylä, Jyväskylä, Finland**
Inflationary Cross-Correlations of Non-minimal Spectators and Their Soft Limits
- 20 Sept. 2023 **Lorentz Institute of Theoretical Physics, Leiden University, Netherlands**
Inflationary Cross-Correlations of Non-minimal Spectators and Their Soft Limits
- 18 Sept. 2023 **Van Swinderen Institute for Particle Physics and Gravity, University of Groningen, Netherlands**
Non-Gaussianities from spectator fields and the related violation of consistency relations
- 21 Aug. 2023 **Department of Physics, Govt. College Madappally, Kerala, India**
An invitation to the theory of cosmological correlators
- 26 Mar. 2022 **Weekly online meeting on cosmology, Indian Institute of Technology Madras, India**
Primordial correlation of gravitons with gauge fields
- Feb. 2021 **Department of Physics, SARBTM Govt. College Koyilandy, Kerala, India**
Precision Cosmology: A modern view of the origin and evolution of our Universe
- Jan. 2021 **Department of Physics, Govt. College Madappally, Kerala, India**
Primordial Non-Gaussianity

Synergetic activities

- 2022-2023 **Open day volunteer at Indian Institute of Science**
- 2021 – Present **Founding member of Kerala Theoretical Physics Initiative (KTPI)**
KTPI is a collective of faculties, postdoctoral fellows and Ph.D. students across the globe who are originally from Kerala. For more details: keralatpi.github.io
- August 2020–
October 2020 **Developed Physics Resource Hub for Govt. College Madappally**
We, a group of physics alumni of Govt. College Madappally, developed a website for useful online physics resources. For more details: gcmphysalum.github.io
- 2018 – 2019 **Note Book Drive volunteer**
Note Book Drive (NBD) at IISc is a student-run voluntary organization working towards improving quality of education in underprivileged government schools in and around Bangalore.

Reference

Dr. Rajeev Kumar Jain

Assistant Professor
Department of Physics
Indian Institute of Science, Bangalore, India
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Prof. Martin S. Sloth

Professor
CP3-Origins, Center of Cosmology and Particle Physics
SDU (University of Southern Denmark), Campusvej 55, 5230 Odense M, Denmark
Email: sloth@cp3.sdu.dk

Prof. L. Sriramkumar

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Indian Institute of Technology Madras, Chennai 600036, India
Email: sriram@physics.iitm.ac.in