

Mohd Kamran, Senior Research Fellow

Academic Positions

- Jan. 2021– **Senior Research Fellow**, Indian Institute of Technology Indore, Indore, India
2018–2020 **Junior Research Fellow**, Indian Institute of Technology Indore, Indore, India

Research Interests

Cosmic Dawn, Epoch of Reionization, Neutral Hydrogen (H_{I}) 21-cm Cosmology, Statistical Methods in Cosmology, Statistics of Non-Gaussian signal, Cosmological Simulations, Large-Scale Structure formation.

Collaborators

Dr. Suman Majumdar (IIT Indore, India), **Dr. Raghunath Ghara** (Technion, Israel), **Prof. Garrelt Mellema** (Stockholm University, Sweden), **Prof. Somnath Bharadwaj** (IIT Kharagpur, India), **Dr. Rajesh Mondal** (Stockholm University, Sweden) **Dr. Jonathan R. Pritchard** (Imperial College London, U.K.), **Prof. Ilian Iliev** (University of Sussex, U.K.)

PhD Supervisor

Dr. Suman Majumdar

suman.majumdar@iiti.ac.in

Education

- 2018– **Ph.D. in Astronomy**
Indian Institute of Technology Indore, India
◦ **Ph.D. Thesis:** "*The non-Gaussianity in the H_{I} 21-cm signal from the Cosmic Dawn and the Epoch of Reionization (in progress)*", under supervision of **Dr. Suman Majumdar**
- 2015–2017 **M.Sc. in Physics**
Banaras Hindu University, India
◦ **M.Sc. Thesis:** "*Normal Mode Analysis of 2, 3, 5, 6-Tetrachloro-p-Benzoquinone*", under supervision of **Prof. R. A. Yadav**
◦ **Performance:** 1st class; CGPA – 7.41/10
- 2011–2014 **B.Sc. in Physics (Hons.)**
Banaras Hindu University, India
◦ **Performance:** 1st class; Aggregate – 7.13/10

Publications

arXiv: http://arxiv.org/a/kamran_m_1

ORCID: <https://orcid.org/0000-0002-0107-9844>

Google Scholar: <https://scholar.google.com/citations?user=Ge5YN6wAAAAJ&hl=en&oi=ao>

2021

1. **Kamran M.**, Ghara R., Majumdar S., Mondal R., Mellema G., Bharadwaj S., Pritchard J. R., Iliev I. T. *Redshifted 21-cm bispectrum – II. Impact of the spin temperature fluctuations and redshift space distortions on the signal from the Cosmic Dawn*, Monthly Notices of the Royal Astronomical Society, Volume 502, Issue 3, April 2021, p.3800–3813, DOI: [10.1093/mnras/stab216](https://doi.org/10.1093/mnras/stab216) , [arXiv:2012.11616](https://arxiv.org/abs/2012.11616)

2020

2. Majumdar S., **Kamran M.**, Pritchard J. R., Mondal R., Mazumdar A., Bharadwaj S., Mellema G. *Redshifted 21-cm bispectrum – I. Impact of the redshift space distortions on the signal from the Epoch of Reionization*, Monthly Notices of the Royal Astronomical Society, Volume 499, Issue 4, December 2020, p.5090–5106, DOI: [10.1093/mnras/staa3168](https://doi.org/10.1093/mnras/staa3168), [arXiv:2007.06584](https://arxiv.org/abs/2007.06584)

3. Saxena A., Majumdar S., **Kamran M.**, Viel M., *Impact of dark matter models on the EoR 21-cm signal bispectrum*, Monthly Notices of the Royal Astronomical Society, Volume 497, Issue 3, September 2020, p.2941–2953, DOI: [10.1093/mnras/staa1768](https://doi.org/10.1093/mnras/staa1768) , [arXiv:2004.04808](https://arxiv.org/abs/2004.04808)

Talks and Presentations

International Conferences

- Title: *Probing the IGM physics during the Cosmic Dawn through the 21-cm signal bispectrum*, Oral Presentation, **A Precursor View of the SKA Sky**, March 15 – March 19, 2021 (Online).
- Title: *Probing the IGM physics during the Cosmic Dawn through the 21-cm signal bispectrum*, Oral Presentation, **The 21-cm Signal from Cosmic Dawn and the Epoch of Reionization**, January 29, 2021, SAZERAC Sip (Online). [[Video-Link](#)]
- Title: *Redshift space 21-cm bispectrum from the Cosmic Dawn: The impact of the spin-temperature fluctuations*, Oral Presentation, **3rd Global 21-cm Workshop**, October 19 - October 22, 2020, Cambridge University, UK (Online). [[Video-Link](#)]
- Title: *Redshift space 21-cm bispectrum from the Cosmic Dawn: The impact of different source models*, Oral Presentation, **SUMMER ALL ZOOM EPOCH OF REIONIZATION ASTRONOMY CONFERENCE**, July 6 - July 9, 2020 (Online). [[Video-Link](#)]
- Title: *The HI 21-cm signal bispectrum from the Cosmic Dawn: The impact of different source models*, Oral Presentation, **Observing The First Billion Years of the Universe Using Next Generation Telescopes**, January 20 - January 24, 2020, Indian Institute of Technology Indore, Indore, Madhya Pradesh, India.

National Conferences/Workshops

- Title: *Probing the IGM physics during the Cosmic Dawn through the 21-cm signal bispectrum*, Oral Presentation, **SKA-India Workshop on 21-cm Cosmology and Reionization**, April 19 - April 23, 2021, Indian Institute of Science, Bengaluru (Online). [[Video-Link](#)]

Schools Attended

- **Cosmology - The Next Decade**, January 3 - January 19, 2019, International Centre for Theoretical Sciences - TIFR, Bengaluru.
- **Frontiers in 21 cm Cosmology**, December 10 - December 18, 2018, Kodaikanal Solar Observatory (IIA), Kodaikanal.

Technical Skills

- **Programming Languages:** C, Python, FORTRAN
- **Graphical Softwares:** Matplotlib, GNUPlot
- **Scientific Packages:** Numerical Recipes in C, GNU Scientific Library, The Fastest Fourier Transform in the West (FFTW), NumPy, SciPy, GRIZZLY, ReionYuga.
- **Operating Systems:** Linux, Windows
- **Text Processing & Markup:** L^AT_EX, MS Office, Libre Office, HTML

Fellowships, Awards & Memberships

- 2018– Member of the **SKA-India CD/EoR Science Working Group**
- 2021– **Senior Research Fellowship** from *Ministry of Human Resource Development (MHRD)*, India
- 2018–2020 **Junior Research Fellowship** from *Ministry of Human Resource Development (MHRD)*, India
- 2018 Qualified in **Graduate Aptitude Test (GATE)**, India
- 2015 Qualified in **Post-graduate Entrance Test–Banaras Hindu University (PET–BHU)**, India
- 2011 Qualified in **Under-graduate Entrance Test–Banaras Hindu University (UET–BHU)**, India

Outreach Activities

- **Bapu Khagol Mela (Gandhi Astro Fair)**, December 2018, IIT Indore, India

Teaching Experiences

- Autumn, 2019 **Tutor**, *Relativity and Cosmology* [AA 471/671], IIT Indore, India.
- Spring, 2019 **Lab Instructor**, *Astronomy Laboratory-II (Section: Optics)* [AA 652], IIT Indore, India.

Students Mentored

- 2020– **Adarsh Pathak**, *M.Sc.*, DAASE, IIT Indore, India.
- 2019–2020 **Himanshu Tiwari**, *M.Sc.*, DAASE, IIT Indore, India.
[Pursuing Ph.D. at University of Groningen, the Netherlands]
- 2019–2020 **Anchal Saxena**, *M.Sc.*, DAASE, IIT Indore, India.
[Pursuing Ph.D. at Curtin University, Australia]

Languages

- **Hindi:** Native
- **English:** Proficient

References

- **Dr. Suman Majumdar**, *Department of Astronomy, Astrophysics and Space Engineering (DAASE)*, Indian Institute of Technology Indore, Indore, India – 453552.
Contact: suman.majumdar@iiti.ac.in, +91-7324-306863
- **Dr. Raghunath Ghara**, *Department of Physics*, Technion, Haifa, Israel – 32000.
Contact: ghara.raghunath@gmail.com
- **Prof. Garrelt Mellema**, *The Oskar Klein Centre, Department of Astronomy*, Stockholm University, AlbaNova, SE-10691 Stockholm, Sweden.
Contact: garrelt.mellema@astro.su.se, +46855378552
- **Prof. Somnath Bharadwaj**, *Department of Physics*, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India–721302. **Contact:** somnath@phy.iitkgp.ac.in, +91-3222-283806.

Contact Information

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Indian Institute of Technology Indore
Indore, Madhya Pradesh, India – 453 552.

Date of Birth: 17th May, 1990

Declaration

I hereby declare that the above information furnished is correct to the best of my knowledge.