Mayuri Sathyanarayana Rao

CONTACT INFORMATION

Research School of Astronomy & Astrophysics (RSAA)
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RESEARCH INTERESTS

Experimental and Observational cosmology – Cosmic Microwave Background, CMB spectral distortions, especially those arising in epochs from cosmological recombination through reionization, at decametre to centimeter wavelengths. System science and radio astronomy with an emphasis on precise calibration of radio-spectrometers, foreground modelling and separation.

EDUCATION

The Australian National University, ACT

Ph.D. Candidate, Astronomy & Astrophysics (expected July 2017)

- Dissertation Topic: On the detection of spectral distortions in the CMB: recombination to reionization.
- Advisor: Frank Briggs (ANU), Ravi Subrahmanyan (RRI)

Visvesvaraya Technological University, INDIA

B.E. in Electronics & Communication, May 2010

- Higher Distinction, University Rank 5 (semesters V - VIII consolidated)

PUBLICATIONS

Refereed Journals

Mayuri Sathyanarayana Rao, Ravi Subrahmanyan, Udaya Shankar Narayana Rao, Jens Chluba, *Modeling the Radio Foreground for detection of spectral distortions from Cosmic Dawn and the Epoch of Reionization*, submitted to ApJ (2016)

Mayuri Sathyanarayana Rao, Ravi Subrahmanyan, Udaya Shankar Narayana Rao, Jens Chluba, *GMOSS: All-sky model of spectral radio brightness based on physical components and associated radiative processes*, accepted for publication in AJ (2016)

Mayuri Sathyanarayana Rao, Ravi Subrahmanyan, Udaya Shankar Narayana Rao, Jens Chluba, *On the detection of spectral ripples from the Recombination Epoch*, 2015, ApJ, 810, 3

Conference Proceedings

Ravi Subrahmanyan, Agaram Raghunathan, N. Udaya Shankar, Saurabh Singh, Sharath Puthige, Nivedita Mahesh, **Mayuri Sathyanarayana Rao**, *Wideband Antennas for Precision Spectral Radiometers for Cosmology*, ICEAA-IEEE APWC 2016

Subrahmanyan, R., Shankar Narayana Rao, U., **Sathyanarayana Rao, M.**, & Singh,

S., *Detecting signatures of cosmological recombination and reionization in the cosmic radio background*, IAU General Assembly 2015, 22, 2250805

Agaram Raghunathan, Udaya Shankar Narayana Rao, **Mayuri Sathyanarayana Rao**, Ravi Subrahmanyan, *Design of frequency independent profiled discone antenna for detecting spectral ripples from the epoch of recombination*, ICEAA-IEEE APWC 2015

R. Subrahmanyan, N. U. Shankar, N. Patra, **M. S. Rao**, N. Mahesh and A. Raghunathan, *Signatures in the cosmic radio background from spin flip and recombination in cosmological hydrogen*, General Assembly and Scientific Symposium (URSI GASS), 2014 XXXIth URSI, Beijing, 2014, pp. 1-4.

Observing Time Awarded

VLA	Semester 15A *Astrophysics of the 2p-2s fine structure line of Hydrogen* (**PI**)
ATCA	Semester 2014OCT *Astrophysics of the 2p-2s fine structure line of Hydrogen* (**PI**)
VLA	Semester 16A, 16B *Probing the History of Black Hole Spin Orientations with Radio Galaxies*
LCO	Semester 16B *Probing the History of Black Hole Spin Orientations with Radio Galaxies* (**PI**)

Awards and recognitions

Peter McGregor Scholarship awardee (2016) for excellence in research in the Research School of Astronomy & Astrophysics (Australian National University) instrumentation program, or excellence in research that has a substantial instrumentation component

Australian Academy of Science nominee to Lindau Nobel Laureate's meeting 2016

RSAA overseas travel grant (2015) for participation in the CMB spectral distortions workshop, KICP, University of Chicago

RSAA Three minute thesis (2014) - First Place Winner and People's Choice Award

Selected Talks

Outrigger antennas for Global EoR with SKA - A dual role for SKA, Science for the SKA generation, SKAO conference, Goa (November 2016)

Erasing foregrounds for EoR science with SKA, Science for the SKA generation, SKAO conference, Goa (November 2016)

APSERa - Array of Precision Spectrometers for the Epoch of RecombinAtion, CMB spectral distortions from cosmic baryon evolution, Raman Research Institute (July 2016)

On the detection of spectral ripples from the Recombination Epoch, National Radio Astronomy Observatory, Socorro (July 2015)

The hidden message from the first atoms, Mt.Stromlo Christmas seminars, The Australian National University, Awarded best science talk (November 2014)

On the detection of spectral ripples from the Recombination Epoch Student seminars, The Australian National University, Awarded best talk (June 2014)

Conferences

Meeting of the Astronomical Society of India, 2016, Poster: *Modelling the radio foreground for detection of spectral distortions from the Epoch of Reionization*

CMB spectral distortions workshop, KICP Chicago, 2015

CAASTRO annual retreat, 2014, Poster: *Signals from the epoch of RECOMBINATION* - best student poster

The COSPAR Scientific assembly, 2012, Poster: *An investigation of kHz QPOs of some LMXBS against their broad band spectral characteristics*

Scientific Research Experience

2012–present	On the detection of spectral distortions in the CMB: recombination to reionization *Advisor*: Ravi Subrahmanyan; Frank Briggs Raman Research Institute; Australian National University
2011–2012	Investigate the power density spectra and kHz QPOs of some LMXBs against their broad band spectral characteristics *Advisor*: Biswajit Paul (Raman Research Institute)
2010 Jun – 2011	Design of an ultra wide-band antenna operating between 30 MHz to 860 MHz, for deployment in an aperture array *Advisor*: Avinash Deshpande, Ravi Subrahmanyan, N Udaya Shankar (Raman Research Institute)
2010 Jan – 2010 Jun	Structural Health Monitoring System: Implementation of the software algorithm in VHDL and realization on an FPGA *Advisor*: J. Jayanthi; Indumathi G National Aerospace Laboratories; CMR Institute of Technology

Outreach

Founding member of the Hands-On-Learning Initiative. HOLI is an initiative to bring hands-on learning using everyday objects, particularly into public schools and low-income communities . HOLI promotes a spirit of inquiry by reaching out to audiences through workshops, street performances and podcasts in English and vernacular languages in India.

Science mentor at the Notebook Drive, IISc, Bangalore. The science mentorship program entails one-on-one interactions with children from public schools in Bangalore, India with an aim to encourage hands-on learning and continuing education in STEM fields.

Astronomy outreach at RSAA, Mt.Stromlo. I volunteer to engage public in stargazing at Mt. Stromlo Observatory.

Software tools and packages

Python, C, C++, IDL, HEALPix, Common Astronomy Software Applications (CASA), WIPL-D (Electromagnetic simulation software), MIRIAD radio astronomy package

References

Ravi Subrahmanyan, Raman Research Insitute, `rsubrahm@rri.res.in`

Jens Chluba, University of Manchester, `jens.chluba@manchester.ac.uk`

Ronald Ekers, CSIRO Astronomy Space Science `Ron.Ekers@csiro.au`

N Udaya Shankar, Raman Research Insitute, `uday@rri.res.in`