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Biographical Information

Nationality: Indian

Education

Ph. D. , Physical Sciences, Jawaharlal Nehru University, New Delhi	Oct. 2011
Work carried out at the Raman Research Institute, Bangalore.	
M. Sc. , Physics, Indian Institute of Technology (IIT), Madras	Jul. 2005
B. Sc. , Physics, University of Mumbai	Jun. 2003

Ph. D. Thesis

Thesis Title: A Multiwavelength Study of Radio Halos and Relics in Clusters of Galaxies

Thesis Advisor: K. S. Dwarkanath, Raman Research Institute, Bangalore, India.

Professional Appointments

Associate Professor G, NCRA-TIFR, Pune, India, Jan. 2023 – present.

Reader-F, NCRA-TIFR, Pune, India, Oct. 2017 – Dec. 2022.

DST-INSPIRE Faculty, NCRA-TIFR, Pune, India, May 2015 – Oct. 2017.

Post-doctoral Visiting Scientist, NCRA-TIFR, Pune, India, Jun. 2014 - Apr. 2015.

Post-doctoral Research Associate, joint appointment at the Department of Physics and Astronomy, University of Bologna and the Institute of Radio Astronomy, Bologna, Italy, Dec. 2011 – Jun. 2014.

Post-doctoral Fellow, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India, Apr. – Nov. 2011.

Research Interests

- Galaxy clusters: Cosmic rays and magnetic fields in the intra-cluster medium and their connection to cluster dynamical state.
- Radio galaxies: Origin and evolution of the radio spectra of compact and diffuse components of radio galaxies.
- Radio astronomy techniques: Develop and maintain pipeline for continuum imaging with the Upgraded GMRT (<https://github.com/ruta-k>). Tutorials for the GMRT/uGMRT data reduction (<https://gmrt-tutorials.readthedocs.io/en/latest/index.html>).

Summary of publications (list attached)

Refereed publications: 60 (lead author on 19) (NASA Astrophysical Data Service)

h-index: 21 (as of July 2024 according to NASA Astrophysical Data Service)

Reviews: 5

Papers in conference proceedings: 9

Awards/Honours

1. **2024**, Elected to the organising committee of commission B4 (Radio Astronomy) of the International Astronomical Union (IAU).
2. **2023**, Associate of the Indian Academy of Sciences, Bangalore.
3. **2022**, Science and Engineering Research Board (SERB) Women Excellence Award (3 years project fund).

4. **2022**, Loksatta Tarun Tejankit Award¹.
5. **2022**, Elected as a Councillor on the Executive Council of the Astronomical Society of India.
6. **2020**, Associate of the Indian Academy of Sciences, Bangalore (2020 - 2023).
7. **2019**, Helena Kluyver Fellowship, ASTRON, The Netherlands (a two month fully funded visit to work with ASTRON staff).
8. **2017**, Young Scientist Award, International Union of Radio Sciences (URSI).
9. **2016**, Best Poster Award in Extragalactic Astronomy, 34th meeting of the Astronomical Society of India (ASI).
10. **2015**, DST-INSPIRE Faculty Award, Department of Science and Technology, Government of India.
11. **2005**, Qualified for Lectureship in the CSIR-UGC, National Eligibility Test in Physical Sciences.
12. **2003 - 2005**, Institute Merit Scholarship, IIT, Madras.

Service to the Profession

1. **Product Owner** of the team Dhruva under the SKAO Science Data Processor (SDP).
2. **Co-chair** of the Focus Group “Large scale structure” under the SKAO Extragalactic Science working Group (2024 –).
3. **Chair** of the Continuum Surveys Science working group of SKA-India (2024 –).
4. Member of the **CASA users’ committee now called the NRAO DMS Panel of the Users Committee (2021 –)**. This is an international committee of users of CASA software that has regular dialogue with developers of CASA based in NRAO, USA.
5. Member of the Square Kilometer Array working groups on continuum science and resource centres.
6. Astronomical Society of India Vision Document (One of the two leads on the Chapter “Galaxies, clusters and inter-galactic medium”).
7. Led the SKA-India JoAA special issue chapter on “Clusters of galaxies and the cosmic web with the Square Kilometre Array” (2016).
8. **Refereed papers for the following journals:**
The Astrophysical Journal, Nature Astronomy, Astronomy and Astrophysics, Monthly Notices of the Royal Astronomical Society, Science, Proceedings of Science, Journal of Astrophysics and Astronomy and Astronomische Nachrichten
9. **Examiner** on 5 PhD theses (IISc, IISER Pune, IISER Mohali, University of Bologna, Leiden University) since 2017.
10. Lecture in the module “Galaxies and clusters of galaxies” of the “Astronomy and Astrophysics” course (2018) under the **SWAYAM** (Free Online Education) initiative of the Ministry of Human Resource Development, Government of India.
11. **Refereed observing proposals** for the Giant Metrewave Radio Telescope and ASTROSAT.
12. Member of the ASTROSAT Science Working Group since Jan. 2019.

Administrative roles

- Member of the NCRA Internal Committee 2024 — present.
- Presiding officer of the NCRA Internal Committee 2021 —2023.
- NCRA Hostel Warden, 2021 — present.
- Member of the NCRA library committee, 2022 — present.
- Member of the Academic Affairs Committee of NCRA, 2022 — present.
- Member of the Student Grievance Redressal Committee of NCRA, 2023 – present.

Teaching and Mentoring Experience

¹Loksatta is a leading Marathi newspaper and this award is for individuals under the age of 40 years who are making impactful contribution.

- Taught “**Astronomical Techniques II**”, IUCAA-NCRA graduate school 2022 (class of 22).
- Taught “**Astronomical Techniques II**”, IUCAA-NCRA graduate school 2021 (class of 17).
- Supervised one M. Phil. thesis at NCRA.
- Supervisor of 2 PhD students at NCRA and co-supervisor of 2 external PhD students.
- Guided three month graduate projects of 6 students at NCRA since 2020.
- Project students: 2 from IASc in 2022, 4 VSRP, 5 others.
- Eight project students (2013 - 2019): One year-long project, one 6-month JRF project, three short term projects, two Master’s theses at S. P. Pune University, co-supervised one Masters’ thesis at University of Bologna.

Professional membership

1. Life member of the Indian Radio Science Society (InRASS), 2022-.
2. Member of the International Astronomical Union (IAU), 2018-.
3. Life member of the Astronomical Society of India (ASI), 2017- .
4. Associate of INAF (National Institute of Astronomy, Italy), 2012 - 2015.

Organization of schools/conferences/workshops

- Initiator and coordinator of the Radio Astronomy Techniques Seminars (RATeS), 2024 – .
- Member of the Scientific Organising Committee (SOC) of the Focus Meeting 6 at the IAU General Assembly 2022, Busan, Korea.
- Co-organizer of Radio Astronomy School 2023.
- Co-organizer of Radio Astronomy Winter School 2020 and 2021.
- Organizer of the Radio Astronomy Schools in 2023, 2019 and 2015, NCRA, TIFR, Pune.
- Founded the “CASA discussion group” (July 2016) at NCRA to bring about discussion on the software for the GMRT data analysis. I conduct bi-weekly discussion meetings, moderate discussions in an online forum on google groups and conduct “Scripting marathon” (a one day event dedicated to writing scripts for radio data analysis) every six months to foster the skills among students/postdocs/faculty regarding the softwares for radio data analysis.
- Co-convenor of the parallel session on Astrophysics at the National Space Science Symposium, 29 - 31 Jan. 2019, Pune, India.
- Member of Local Organizing Committee for the workshop on “Science with the u-GMRT”, NCRA-TIFR, Pune, June, 2016.
- Co-organizer of the Advanced Radio Astronomy School-2014, NCRA, TIFR, Pune, Aug. 2014.
- Member of the Local Organizing Committee for “Diffuse Relativistic Plasmas Workshop”, RRI, Bangalore, March, 2011.

Seminars and Colloquia

1. Seminar at the Indian Association for the Cultivation of Science (IACS), Kolkata, 15th Sept. 2022.
2. Colloquium at the National Centre for Radio Astrophysics, Aug. 2021.
3. Seminar at the Indian Institute of Science, 7th April 2021.
4. Colloquium at Inter University Centre for Astronomy and Astrophysics, Nov. 2019.
5. Lunch talk at ASTRON, Oct. 2019.
6. Colloquium at the National Centre for Radio Astrophysics, Mar. 2018.
7. Seminar at the Indian Institute of Science, Mar. 2016.
8. Seminar at the Department of Astronomy and Astrophysics, TIFR, Mumbai, Jan. 2015.
9. Seminar at the ‘Workshop on galaxies and cosmology’, NCRA-TIFR, Jul. 2014.

10. Seminar at NCRA-TIFR, Jan. 2014.
11. Colloquium at Institute of Radio Astronomy, Bologna, Sept. 2013.
12. Seminar at Inter-University Centre for Astronomy and Astrophysics, Pune, Oct. 2013.
13. Seminar at Institute of Radio Astronomy, Bologna, Italy, Jul. 2008.
14. Seminar at Max Planck Institute for Astrophysics, Garching, Jul. 2008.

Conference talks/posters (2012- present)

1. **Invited talk** at GALFLOWS workshop at IUCAA, Feb. 2023.
2. **Invited talk** at the meeting Cosmic Crowd at IUCAA, Dec. 2022.
3. **Invited talk** at the Focus Meeting 6, International Astronomical Union General Assembly, busan, Korea, Aug. 2022.
4. Talk at the URSI AT-AP-RASC, Gran Canaria, May 2022.
5. Talk at the annual meeting of the Astronomical Society of India, March 2022.
6. Special talk on data analysis pipeline release on the occasion of 20 years of GMRT operations, 4-5 October 2021.
7. **Invited talk** at the special session on AGN and Galaxy clusters at the European Astronomical Society's 2021 meeting.
8. **Invited talk** at the 86th Annual Meeting of the Indian Academy of Sciences in Nov. 2020.
9. Talk at the European Astronomical Society annual meeting, June 2020.
10. Remote talk at the SKA Pathfinder Radio Continuum Survey (SPARCS) -2019 meeting.
11. Talk at the continuum surveys working group break out session at the "SKA science meeting", 8-12 Apr. 2019, Manchester, UK.
12. Poster at the "SKA science meeting", 8-12 Apr. 2019, Manchester, UK.
13. **Invited talk** at the "Metrewavelength Sky II", 18 - 22 Mar. 2019, Pune, India.
14. One technical talk and one science talk at URSI-APRASC, 11 - 14 March 2019, New Delhi, India.
15. **Invited talk** at the "Perseus in Sicily: From blackholes to cluster outskirts", 14-18 May 2018, Noto, Sicily, Italy.
16. One **invited** and one contributed talk at the SNOWCLUSTER 2018, 18 - 23 March 2018, Utah, USA.
17. Talk at "Physics of the intra-cluster medium", 3- 7 Apr. 2017, Beijing, China.
18. Talk at "SKA 2016: Science for the SKA generation", Nov. 2016, Goa, India.
19. Talk at "SKA Pathfinders Radio Continuum Surveys", Nov. 2016, Goa, India.
20. Talk at "The many facets of extra-galactic radio surveys: towards new scientific challenges", Oct. 2015, CNR, Bologna, Italy.
21. **Invited review** at the workshop on "Science with the uGMRT", Jun. 2016, NCRA-TIFR, Pune, India.
22. **Invited review** at the meeting "Continuum survey Science with SKA: The Indian Perspective", Jan. 2016, NCRA-TIFR, Pune, India.
23. Talk at "Extra-galactic jets: causes and effects", Oct. 2015, ICTS, Bangalore, India.
24. Talk at 33rd meeting of the Astronomical Society of India, Feb. 2015, NCRA-TIFR, Pune.
25. Talk at "The metre-wavelength sky", Dec. 2013, NCRA-TIFR, Pune, India.
26. Talk at "Galaxy clusters as giant cosmic laboratories", May 2012, Madrid, Spain.

Training received

1. **SKA Regional Centre Training Event**, 2022, 27 Jan. - 14 Feb. (Online).
2. LOFAR Data Analysis School, November 2014, ASTRON, Dwingeloo, The Netherlands.
3. Workshop on Python Programming, February 2014, IUCAA, Pune, India.
4. Enrico Fermi School on Astrophysics of Galaxy Clusters, July 2008, Italian Physical Society, Varenna, Italy.

5. Indian Institute of Astrophysics(IIA)- Penn State School on Astro-statistics, 2007, Vainu Bappu Observatory, Kavalur, India.
6. Indo-French School on Optical Observations, February 2007, IUCAA, Pune, India.
7. Radio Astronomy School, July 2006, NCRA-TIFR, Pune, India.
8. Visiting Students Research Program - 2004, NCRA-TIFR, Pune, India.

Outreach

1. Member of the SKA-India Education and Public Outreach committee (2021-).
2. Talk on Science with the uGMRT for the telecommunications officials from the government, May 2023.
3. A lecture on “Radio Astrophysics” in Marathi for the programme “Rising stars in space science” of the Marathi Vidnyan Parishad, Pune, 5th Sept. 2021.
4. Audio recordings in Marathi for scientific posters for the GMRT Science Day 2021 held virtually.
5. **Technical support** for the documentary film “Dr. Govind Swarup and the Radio Astronomy Group: A collective lookback” screened at the event celebrating 90th birthday of Dr. Govind Swarup on 21st March 2019, during the conference “The Metrewavelength Sky II”, Pune.
6. Special lecture on “**Astronomy research with the GMRT and its connection to people**” at the inauguration of Ambegaon Taluka Science exhibition held on 4th Dec. 2018 at Ghodegaon, Taluka Ambegaon.
7. Talk on “**Galaxy clusters in radio bands: uncovering the invisible**” for IISER, Pune students organised by Akashganga Astronomy Club in Sept. 2018.
8. Talk “**Cosmic fireworks in radio waves**” in the 9th edition of the “Pune Science on Tap”.
9. Conducted a game called “**Know your scientists**” aimed at promoting gender equality in science at the ASI meeting in Osmania University Hyderabad, 2018 and at the GMRT Science Day, 2018. The game is now a regular activity at the **Rural Science Centre**, Khodad.
10. Talks in schools and colleges during the outreach at the meetings of the Astronomical Society of India 2015 (Pune), 2016 (Srinagar, Kashmir) and 2018 (Hyderabad).
11. Talk on “**Science with Radio Telescopes**” in the Certificate course in Astronomy and Astrophysics, Department of Extra-Mural Studies, Mumbai University, Feb. 2017.
12. Co-ordinated the academic posters and the “**Ask an Astronomer**” desk at the National Science Day (2015, 2016) at the GMRT. Ran the afternoon session of the “Ask an astronomer“ desk on 01 March 2019.
13. Member of Khagol Mandal (2001 - 2005): Carried out public star gazing sessions, astronomy slide-shows for school children and trained high school students in the use of small telescopes.

Publications in refereed journals

1. *An upgraded GMRT and MeerKAT study of radio relics in the low mass merging cluster PSZ2 G200.95-28.16*
Pal, A., **Kale, R.** et al [arXiv2411.15480](https://arxiv.org/abs/2411.15480).
2. *The Radio Halo in PLCKESZ G171.94-40.65: Beacon of Merging Activity*
Santra, R., **Kale, R.** et al [2024, ApJ, 976, 66](#).
3. *The prototypical major cluster merger Abell 754: I. Calibration of MeerKAT data and radio/X-ray spectral mapping of the cluster*
Botteon, A. et al (including **Kale, R.**) [2024, A&A, 690, 222](#).
4. *Cygnus X-3 revealed as a Galactic ultraluminous X-ray source by IXPE*
Veledina, A. et al (including **Kale, R.**) [2024, Nature Astronomy, 8, 1031](#).
5. *A New Enigmatic Radio Relic in the Low-mass Cluster Abell 2108*
Chatterjee, S. et al (including **Kale, R.**) [2024, MNRAS, 527, 10986](#).

6. *Are Radio Minihalos Confined by Cold Fronts in Galaxy Clusters? Minihalos and Large-scale Sloshing in A3444 and MS 1455.0+2232*
Giacintucci, S. et al (including **Kale, R.**) 2024, *ApJ*, 961, 18.
7. *A Deep uGMRT view of the ultra steep spectrum radio halo in Abell 521*
Santra, R., **Kale, R.** et al 2024, *ApJ*, 960, 40.
8. *Discovery of A Large-scale Bent Radio Jet in the Merging Cluster A514*
Lee, W., et al (including **Kale, R.**) 2022, *ApJ Letters*, 957, 7.
9. *Diffuse radio source candidate in CIZA J1358.9-4750*
Kurahara, K., Akahori, T., **Kale, R.** et al 2023, *PASJ*, 75, 138.
10. *SoUthern Cluster sCale Extended Source Survey (SUCCESS): a GMRT and MeerKAT study of nine massive galaxy clusters*
Kale, R., et al 2022, *MNRAS*, 514, 5969.
11. *Radio halo of NGC 4631: comparing observations and simulations*
Vijayan et al (including **Kale, R.**) 2022, *MNRAS*, 511, 3150.
12. *Radio footprints of a minor merger in the Shapley Supercluster: From supercluster down to galactic scales*
Venturi et al (including **Kale, R.**) 2022, *A&A*, 660, 81.
13. *Performance Analysis Techniques for Real-Time Broadband RFI Filtering System of uGMRT*
Buch, K., **Kale, R.** et al 2022, *JAI*, 1150008.
14. *Survival of shredded radio galaxy lobes*
Kale, R. 2021, *Nature Astronomy*, 5, 1210 (invited article).
15. *Discovery of a Double Radio Relic in ZwCl1447.2+2619: A Rare Testbed for Shock-acceleration Models with a Peculiar Surface-brightness Ratio*
Lee, W. et al (including **Kale, R.**) 2022, *ApJ*, 924, 18.
16. *Imaging results from the legacy Giant Metrewave Radio Telescope Galaxy Cluster Key Project*
George, L. T., **Kale, R.** and Wadadekar, Y. 2021, *MNRAS*, 507, 4887.
17. *MOSS I: Double radio relics in the Saraswati supercluster*
Parekh, V. et al (including **Kale, R.**) 2022, *MNRAS*, 509, 3086.
18. *GMRT unveils steep-spectrum antique filaments in the galaxy cluster Abell 725*
Pandge, M., **Kale, R.** et al 2022, *MNRAS*, 509, 1837.
19. *A MeerKAT view on galaxy clusters: a radio-optical study of Abell 1300 and MACS J1931.8-2634*
Terni de Gregory, B. et al (including **Kale, R.**) 2021, *MNRAS*, 504, 2924.
20. *Substructure analysis of the RXCJ0232.2-4420 galaxy cluster*
Parekh, V., Lagana, T. F.; **Kale, R.** 2021, *MNRAS*, 504, 610.
21. *Radio halos in a mass-selected sample of 75 galaxy clusters. II. Statistical analysis*
Cuciti et al (including **Kale, R.**) 2021, *A&A*, 647, 51.
22. *Radio halos in a mass-selected sample of 75 galaxy clusters. I. Sample selection and data analysis*
Cuciti et al (including **Kale, R.**) 2021, *A&A*, 647, 50.
23. *An upper limit calculator (UL-CALC) for undetected extended sources with radio interferometers: radio halo upper limits*
George, L. T., **Kale, R.** and Wadadekar, Y. 2021, *ExA,tmp*, 3.
24. *CAPTURE: a continuum imaging pipeline for the uGMRT*
Kale, R. and Ishwara-Chandra C. H. 2021, *ExA*, 51, 95.

25. *MeerKAT's discovery of a radio relic in the bimodal merging cluster A2384*
Parekh, V., Thorat, K., **Kale, R.**, et al [2021,MNRAS,499,404](#).
26. *New mysteries and challenges from the Toothbrush relic: wideband observations from 550 MHz to 8 GHz*
Rajpurohit, K. et al (including **Kale, R.**),[2020, A&A, 636, 30](#).
27. *Expanding the Sample of Radio Minihalos in Galaxy Clusters*
Giacintucci, S. et al (including **Kale, R.**), [2019,ApJ, 880, 25](#).
28. *A radio halo surrounding the Brightest Cluster Galaxy in RXCJ0232.2-4420: a mini-halo in transition ?*
Kale, R., Shende K. M. and Parekh, V. [2019, MNRAS Letters, 480, 37](#).
29. *The expanded Giant Metrewave Radio Telescope*
Patra, N. N. et al (including **Kale, R.**) [2019, MNRAS, 483, 3007](#).
30. *A study of spectral curvature in the radio relic in Abell 4038 using the uGMRT*
Kale, R., Parekh, V. and Dwarakanath, K. S. [2018, MNRAS, 480, 5352](#).
31. *Correlations of the feedback energy and BCG radio luminosity in galaxy clusters*
Iqbal, A., **Kale, R.**, Nath, B. B. and Majumdar, S. [2018, MNRAS, 480, 68](#).
32. *Twin radio relics in the nearby low-mass galaxy cluster Abell 168*
Dwarakanath, K. S., Parekh, V., **Kale, R.** and George, L. T. [2018, MNRAS, 477, 957](#).
33. *New giant radio sources and underluminous radio halos in two galaxy clusters*
Cuciti et al. (including **Kale, R.**) [2018, A&A, 609, 61](#).
34. *Discovery of a radio relic in the low mass, merging galaxy cluster PLCKG200.9-28.2*
Kale, R., Wik. D. R., Giacintucci, S., et al. [2017, MNRAS, 472, 940](#).
35. *Simulations of imaging extended sources with the GMRT and the U-GMRT*
Deo, D. K. and **Kale, R.** [2017, Experimental Astronomy, 44, 165](#).
36. *On the absence of radio halos in clusters with double relics*
Bonafede, A. et al. (including **Kale, R.**), [2017, MNRAS, 470, 3465](#).
37. *Discovery of a fourth arc in Abell 2626 at 610 MHz with the GMRT: spectral properties and possibilities for the origin*
Kale, R. and Gitti, M.,[2017, MNRAS Letters, 466, 19](#).
38. *A study of diffuse radio sources and X-ray emission in six massive clusters*
Parekh, V., Dwarakanath, K. S., **Kale, R.** and Intema, H., [2017, MNRAS, 464, 2752](#).
39. *Active Galactic Nucleus Feedback with the Square Kilometre Array and Implications for Cluster Physics and Cosmology*
Ahangar, A., **Kale, R.** et al. [2017, JApA, 38, 68](#).
40. *A $M \gtrsim 3$ shock in 'El Gordo' cluster and the origin of the radio relic*
Botteon, A., Gastaldello, F., Brunetti, G. & **Kale, R.**, [2016, MNRAS, 463, 1534](#).
41. *How unusual is the cool-core radio halo cluster CL1821+643?*
Kale, R. and Parekh, V., [2016, MNRAS, 459, 2940](#).
42. *Brightest cluster galaxies in the extended GMRT radio halo cluster sample. Radio properties and cluster dynamics*
Kale, R., Venturi, T., Cassano, R., et al., [2015, A&A, 581, 23](#).
43. *Occurrence of radio halos in galaxy clusters. Insight from a mass-selected sample*
Cuciti, V., Cassano, R., Brunetti, G., et al. (including **Kale, R.**), [2015, A&A, 580, 97](#).

44. *The Extended GMRT Radio Halo Survey II: Further results and analysis of the full sample*
Kale, R., Venturi, T., Giacintucci, G. et al. [2015, A&A, 579, 92.](#)
45. *Discovery of large-scale diffuse radio emission and of a new galaxy cluster in the surroundings of MACS J0520.7-1328*
Macario, G., Intema, H. T., Ferrari, C. et al. (including **Kale, R.**), [2014, A&A, 565, 13.](#)
46. *Revisiting scaling relations for giant radio halos in galaxy clusters*
Cassano, R., Ettori, S., Brunetti, G., et al. (including **Kale, R.**), [2013, ApJ, 777, 141.](#)
47. *The Extended GMRT Radio Halo Survey I: New upper limits on radio halos and mini-halos*
Kale, R., Venturi, T., Giacintucci, G. et al. [2013, A&A, 557, 99.](#)
48. *Discovery of a Giant Radio Halo in a New Planck Galaxy Cluster PLCKG171.9-40.7*
Giacintucci, S., **Kale, R.**, Wik, D. R., et al., [2013, ApJ, 766, 18.](#)
49. *Spectral and polarization study of the double relics in Abell 3376 using the Giant Metrewave Radio Telescope and the Very Large Array*
Kale, R., Dwarakanath K. S., Bagchi, J. et al., [2012, MNRAS, 426, 1204.](#)
50. *Multi-frequency Studies of Radio Relics in the Galaxy Clusters A4038, A1664, and A786*
Kale, R. and Dwarakanath K. S., [2012, ApJ, 744, 46.](#)
51. *Spectral Index Studies of Diffuse Radio Emission in Abell 2256: Implications for Merger Activity*
Kale, R. and Dwarakanath K. S. [2010, ApJ, 718, 939.](#)
52. *Diffuse Radio Emission in Abell 754*
Kale, R. and Dwarakanath K. S., [2009, ApJ, 699, 1883.](#)
53. *Relics of Double Radio Sources*
Dwarakanath, K. S. and **Kale, R.**, [2009, ApJ Letters, 698, 163.](#)

Reviews

1. *Exploring diffuse radio emission in galaxy clusters and groups with uGMRT and SKA*
Paul, S., **Kale, R.** et al [2023, JoAA, 44, 38.](#)
2. *Real-time RFI filtering for uGMRT: Overview of the released system and relevance to the SKA*
Buch, K., **Kale, R.** et al [2023, JoAA, 44, 37.](#)
3. *Low frequency observations of radio relics and halos*
Kale, R. [2018, IAU Symp. 342, Invited review talk.](#)
4. *Clusters of Galaxies and the Cosmic Web with Square Kilometre Array*
Kale, R., Dwarakanath, K. S., Lal, D. V., et al., [2016, JApA, 37, 31.](#)
5. *Cluster Radio Halos at the crossroads between astrophysics and cosmology in the SKA era*
Cassano, R., Bernardi, G., Brunetti, G. et al. (including **Kale, R.**), [2015, AASKA, 73.](#)
AASKA: Advancing Astrophysics with the Square Kilometre Array.

Publications in conference proceedings

1. *Radio sources in the Massive and Distant Clusters of the WISE Survey (MaDCoWS)*
Kale, R. and Parekh, V., [2015, Proceedings of Science.](#)
Proceedings of the conference ‘The many facets of extragalactic radio surveys: towards new scientific challenges’ (EXTRA-RADSUR2015), Bologna, Italy.
2. *Radio observations of Planck clusters*
Kale, R., [2013, AN, 334, 338.](#)
Proceedings of the conference ‘Galaxy clusters as giant cosmic laboratories’, Madrid, Spain.

3. *A Zoo of Radio Relics: Cluster Cores to Filaments*
Kale, R. and Dwarakanath, K. S., 2011, [JApA, 32, 537](#).
 Proceedings of the conference ‘Diffuse relativistic plasmas workshop’, Bangalore, India.
4. *Double Relics in the Outskirts of A3376: Accretion Flows Meet Merger Shocks?*
Kale, R., Dwarakanath, K. S., Bagchi, J. and Paul, S., 2011, [JApA, 32, 533](#).
 Proceedings of the conference ‘Diffuse relativistic plasmas workshop’, Bangalore, India.
5. *Discovery of a Giant Radio Halo in a Massive Merging Cluster at $z = 0.443$*
 Dwarakanath, K. S., Malu, S. and **Kale, R.**, 2011, [JApA, 32, 529](#).
 Proceedings of the conference ‘Diffuse relativistic plasmas workshop’, Bangalore, India.
6. *Diffuse Radio Emission in the Galaxy Cluster Abell 754*
Kale, R. and Dwarakanath, K. S., 2009, [ASPC, 407, 237](#).
 Proceedings of the conference ‘The Low-Frequency Radio Universe’, Pune, India.
7. *Steep-Spectrum Sources from the VLA 74 MHz Survey*
Kale, R. and Dwarakanath, K. S., 2009, [ASPC, 407, 162](#).
 Proceedings of the conference ‘The Low-Frequency Radio Universe’, Pune, India.
8. *Simulations of Giant Metrewave Radio Telescope observations*
Kale, R. and Deo D. K., selected for presentation at the URSI General Assembly 2017, Montreal, Canada.
9. *Quantifying the sampling in uv-plane: implications for imaging extended radio sources*
Kale, R., Selected for **Young Scientist Award** with travel grant, URSI General Assembly Aug. 2017, Montreal, Canada.