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Research Interests

X-ray Astronomy, X-ray Binaries, High-energy Astrophysics, Neutron Stars, Cataclysmic Variables, Black Holes, Magnetars, X-ray Pulsars, Ultra-luminous X-ray sources (ULXs), X-ray Polarization, Orbital evolution, X-ray Transients



Research Experience

- Dec 2024 – **  **Post-Doctoral Fellow** – Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India.
- Dec 2021 – Nov 2024  **Post-Doctoral Fellow** – Raman Research Institute, Bangalore, India.
- Jan 2021 – Apr 2021  **Research Associate** – IISER, Mohali, India.

Education

- 2014 – 2021  **Ph.D. Physics**, University of Delhi.
Thesis title: *Study of transient X-ray binaries in the time and energy domains.*
Supervisor: *Prof. Anjan Dutta.*
- 2011 – 2013  **M.Sc. Physics**, University of Delhi.
- 2008 – 2011  **B.Sc. (H) Physics**, Ramjas College, University of Delhi.

Development

- POLIX  Active member of the POLIX science collaboration (PI – B. Paul). This group works on the science goals of the POLIX instrument (built at RRI) onboard *XPoSat* (X-ray Polarimeter Satellite).
- Instrumentation  Development of HK parameters file, participate in the thermo-vac testing of the POLIX instruments, conduct POLIX pipeline testing, Analysis of initial dataset of Crab pulsar, source and background calibration.

Awards and Achievements

Grants

- 2023  **AHEAD2020 TNA** – INAF-IAPS, Italy.
- 2019  **Cospar PCB** – University of Cagliari, Italy.
- 2016–2019  **UGC-Senior Research Fellowship** – University of Delhi, India.
- 2014–2016  **UGC-Junior Research Fellowship** – University of Delhi, India.

Allocated Observing Time

- PI  **XMM-Newton** – AO16 (20 ks)

Awards and Achievements (continued)

- *AstroSAT* – To₃ (80 ks), To₅ (40 ks), A₁₄ (60 ks)
- *NICER* – ToO (2+22 ks)
- *NuSTAR* – Cycle 10 (60 ks), Cycle 11 (60 ks), ToO (2 x 20 ks)
- *Swift* – ToO (2 x 2 ks)
- Co-I ■ *AstroSAT* – A₀₂ (24+20+20 ks), To₃ (50 ks), To₅ (40 ks)

Membership

- ASI ■ Life Member of the Astronomical Society of India (ASI) - [L2552](#)
- IAU ■ Junior Member of the International Astronomical Union (IAU) - [42522](#)

Research Publications ([ADS Link](#))

Journal Articles

- 1 **R. Sharma**, A. Sanna, and P. Sharma, "Broadband Timing and Spectral Study of Accreting Millisecond X-ray Pulsar SAX J1808.4–3658 during Its 2022 Outburst", [The Astrophysical Journal](#) **999**, 133 (2026).
- 2 **R. Sharma**, A. Beri, B. Paul, A. Sanna, C. Maitra, and H. Yang, "Probing accretion dynamics and spin evolution in the X-ray pulsar RX J0520.5–6932 during its 2024 outburst", [Astronomy & Astrophysics](#) **706**, A322, A322 (2026).
- 3 K. Rikame, B. Paul, **R. Sharma**, and V. Jithesh, "Thermonuclear X-ray bursts across the eclipse transitions in the LMXBs EXO 0748-676 and XTE J1710-281", [MNRAS](#) **544**, 13–23 (2025).
- 4 **R. Sharma**, C. Jain, B. Paul, A. Dutta, and V. Rana, "Intriguing nature of AM Her-type candidate CXOU J204734.8+300105", [The Astrophysical Journal](#) **987**, 117 (2025).
- 5 K. Roy and **R. Sharma**, "Detection of CRSF in Cep X-4 at a low luminosity level", [New Astronomy](#) **121**, 102435 (2025).
- 6 **R. Sharma**, "Broadband spectral and emission geometry analysis of XB 1916–053 with Chandra and NuSTAR", [Journal of High Energy Astrophysics](#) **47**, 100376 (2025).
- 7 **R. Sharma**, C. Jain, B. Paul, and A. Beri, "Sidebands to mHz QPOs in 4U 1626–67 in the second spin-down state", [MNRAS](#) **538**, 1046–1054 (2025).
- 8 H. N. Yang, C. Maitra, G. Vasilopoulos, F. Haberl, P. A. Jenke, A. S. Karaferias, **R. Sharma**, et al., "Broadband study of the Be X-ray binary RX J0520.5-6932 during its outburst in 2024", [MNRAS](#) **536**, 1357–1373 (2025).
- 9 M. Kumar, **R. Sharma**, B. Paul, and V. Rana, "Spectral analysis of Ultra-Luminous X-ray pulsars with models of X-ray pulsars", [MNRAS](#) **536**, 340–349 (2025).
- 10 **R. Sharma**, M. Mandal, S. Pal, B. Paul, G. K. Jaisawal, and A. Ratheesh, "Probing the energy and luminosity-dependent spectro-timing properties of RX J0440.9+4431 with AstroSat", [MNRAS](#) **534**, 1028–1042 (2024).
- 11 H. Manikantan, B. Paul, **R. Sharma**, P. Pradhan, and V. Rana, "Energy dependence of Quasi-periodic oscillations in accreting X-ray pulsars", [MNRAS](#) **531**, 530–549 (2024).

- 12 C. Jain, **R. Sharma**, and B. Paul, "A comprehensive study of orbital evolution of LMC X-4: Existence of a second derivative of the orbital period", *MNRAS* **529**, 4056–4065 (2024).
- 13 K. Rikame, B. Paul, **R. Sharma**, V. Jithesh, and K. T. Paul, "Flares during Eclipses of High Mass X-ray Binary Systems Vela X-1, 4U 1700-37, and LMC X-4", *MNRAS* **529**, 3360–3371 (2024).
- 14 K. Roy, **R. Sharma**, H. Manikantan, and B. Paul, "Detection of a cyclotron line in the Be X-ray pulsar IGR J06074+2205", *Astronomy & Astrophysics* **686**, A145 (2024).
- 15 A. Devaraj, **R. Sharma**, S. Nagesh, and B. Paul, "Insights into the phase-dependent cyclotron line feature in XTE J1946+274: An AstroSat and Insight-HXMT view", *MNRAS* **527**, 11015–11025 (2024).
- 16 **R. Sharma**, C. Jain, B. Paul, and T. R. Seshadri, "AstroSat observation of the magnetar SGR J1830-0645 during its first detected X-ray outburst", *MNRAS* **526**, 4877–4884 (2023).
- 17 M. Mandal, **R. Sharma**, S. Pal, G. K. Jaisawal, K. C. Gendreau, M. Ng, A. Sanna, C. Malacaria, F. Tombesi, E. C. Ferrara, C. B. Markwardt, M. T. Wolff, and J. B. Coley, "Probing spectral and timing properties of the X-ray pulsar RX J0440.9 + 4431 in the giant outburst of 2022-2023", *MNRAS* **526**, 771–781 (2023).
- 18 **R. Sharma**, C. Jain, and B. Paul, "4U 1626-67 returns to spin-down: timing features toe the line", *MNRAS* **526**, L35–L40 (2023).
- 19 A. Beri, **R. Sharma**, P. Roy, V. Gaur, D. Altamirano, N. Andersson, F. Gittins, and T. Celora, "AstroSat and NuSTAR observations of XTE J1739-285 during the 2019-2020 outburst", *MNRAS* **521**, 5904–5916 (2023).
- 20 **R. Sharma**, A. Sanna, and A. Beri, "AstroSat observation of the accreting millisecond X-ray pulsar SAX J1808.4-3658 during its 2019 outburst", *MNRAS* **519**, 3811–3818 (2023).
- 21 **R. Sharma**, C. Jain, K. Rikame, and B. Paul, "Broad-band mHz QPOs and spectral study of LMC X-4 with AstroSat", *MNRAS* **519**, 1764–1770 (2023).
- 22 C. Jain, **R. Sharma**, and B. Paul, "Eclipse Timings of the LMXB XTE J1710-281 : discovery of a third orbital period glitch", *MNRAS* **517**, 2131–2137 (2022).
- 23 C. Jain, A. Yadav, and **R. Sharma**, "Change in spin-down rate and detection of emission line in HMXB 4U 2206+54 with AstroSat observation", *Journal of Astrophysics and Astronomy* **43**, 101 (2022).
- 24 P. Sharma, **R. Sharma**, C. Jain, and A. Dutta, "Timing and spectral analysis of HMXB OAO 1657-415 with NuSTAR", *MNRAS* **509**, 5747–5755 (2022).
- 25 P. Sharma, **R. Sharma**, C. Jain, G. C. Dewangan, and A. Dutta, "Broad-band spectral study of LMXB black hole candidate 4U 1957+11 with NuSTAR", *Research in Astronomy and Astrophysics* **21**, 214 (2021).
- 26 P. Sharma, **R. Sharma**, C. Jain, and A. Dutta, "Broad-band spectral analysis of LMXB XTE J1710-281 with Suzaku", *MNRAS* **496**, 197–205 (2020).
- 27 **R. Sharma**, A. Beri, A. Sanna, and A. Dutta, "A broad-band look of the accreting millisecond X-ray pulsar SAX J1748.9-2021 using AstroSat and XMM-Newton", *MNRAS* **492**, 4361–4368 (2020).
- 28 **R. Sharma**, C. Jain, and A. Dutta, "Study of the reflection spectra of SAX J1748.9-2021", *MNRAS* **482**, 1634–1639 (2019).

- 29 **R. Sharma**, A. Jaleel, C. Jain, J. C. Pandey, B. Paul, and A. Dutta, "Spectral properties of MXB 1658-298 in the low/hard and high/soft state", [MNRAS 481, 5560–5569 \(2018\)](#).
- 30 **R. Sharma**, A. Jaleel, C. Jain, B. Paul, and A. Dutta, "Thermonuclear X-ray burst of MXB 1658-298 with NuSTAR", [Journal of Astrophysics and Astronomy 39, 16 \(2018\)](#).
- 31 C. Jain, B. Paul, **R. Sharma**, A. Jaleel, and A. Dutta, "Indication of a massive circumbinary planet orbiting the low-mass X-ray binary MXB 1658-298", [MNRAS 468, L118–L122 \(2017\)](#).

Thesis

- 1 **R. Sharma**, "Study of transient X-ray binaries in the time and energy domains", in [PHD THESIS, UNIVERSITY OF DELHI, INDIA \(2021\)](#).

White Papers and Science Books

- 1 M. Koss and et al. (including **R. Sharma**), "The advanced X-ray imaging satellite (AXIS) community science book", in [Arxiv e-prints \(Oct. 2025\)](#), arXiv:2511.00253.

Non-refereed Article

- 1 K. Roy, **R. Sharma**, H. Manikantan, and B. Paul, "Detection of mHz QPOs in BeXRB pulsar XTE J0111.2-731 (SXP 31.0) in SMC", in [The astronomer's telegram](#), Vol. 17204 (2025).
- 2 M. Mandal, G. K. Jaisawal, S. Pal, and **R. Sharma**, "Probing the cyclotron resonant scattering feature in the X-ray pulsar 2S 1553-542 with NuSTAR during the 2024 outburst", in [The astronomer's telegram](#), Vol. 16859 (2024).
- 3 M. Mandal, G. K. Jaisawal, S. Pal, K. Gendreau, **R. Sharma**, J. B. Coley, and C. Malacaria, "NICER observation of Be/X-ray binary pulsar 2S 1553-542 during its 2024 outburst", in [The astronomer's telegram](#), Vol. 16846 (2024).
- 4 **R. Sharma**, K. Gendreau, Z. Arzoumanian, E. C. Ferrara, P. S. Ray, and A. Sanna, "NICER confirms outburst of RX J0520.5-6932 and detects coherent pulsations", in [The astronomer's telegram](#), Vol. 16569 (2024).
- 5 **R. Sharma**, "Timing analysis of intermittent millisecond X-ray pulsar SAX J1748.9-2021", in [Space research today](#), Vol. 208 (2020), pp. 60–64.

Talks & Posters

- Talks
- 📖 A Decade of AstroSat Observations: Science Outcomes and Future Prospects, ISRO, Bangalore – 30 January - 02 February, 2026
 - 📖 1st International Conference on COMPACT OBJECT ASTROPHYSICS AND ASTRONOMY (COAA), IIT Jodhpur, India – 10-12 December 2025 (3rd best Oral presentation)
 - 📖 National Conference on REcent Trends in the study of Compact Objects (RETCO-VI): Theory and Observation, IIT Indore, India – 10-12 March 2025
 - 📖 APM 2025, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune – 11 Feb, 2025
 - 📖 Raman Research Institute, Bangalore – 30 Nov, 2024

Talks & Posters (continued)

- National Space Science Symposium 2024, Goa University – 26 Feb - 01 Mar, 2024
 - 42nd Meeting of Astronomical Society of India (ASI 2024), IISc Bangalore – Feb 2024
 - SPASE, IIT Kanpur, India – November 2023
 - INAF-OAR, Rome, Italy – September 2023
 - INAF-IAPS, Rome, Italy – September 2023
 - X-ray Universe 2023 Symposium, Athens, Greece – 13-16 June 2023
 - National Conference on REcent Trends in the study of Compact Objects (RETCO-V): Theory and Observation, Kodaikanal, India – 03-05 April 2023
 - 7-years of AstroSat Conference – September 28-29, 2022 [Invited]
 - Istanbul University Observatory Astrophysics talks series (online) – April 2022 [Invited]
 - Conference on 5 years of AstroSat – January 19-21, 2021
 - Department of Physics, University of Cagliari, Italy – 18 February 2020
 - Exploring the Universe: Near Earth Space Science to Extra-Galactic Astronomy (EXPUNIV-2018) at SNBNCBS, Kolkata – 14-17 November 2018
 - Recent Trends in the Study of Compact Objects (RETCO-III) 2017 at IIST Thiruvananthapuram – June 2017
- Poster
- Stellar Variability: Taking the Pulse of the Universe, IUCAA, Pune – 24-28 November 2025
 - X-ray Universe 2023 Symposium, Athens, Greece – 13-16 June 2023
 - XXXVI Meeting of Astronomical Society of India (ASI 2018)
 - XXXV Meeting of Astronomical Society of India (ASI 2017)

Skills



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| Languages | ■ Strong reading, writing and speaking competencies for English, Hindi. |
| Coding | ■ HEASOFT, XSPEC, Bash, Python, Gnuplot, C, \LaTeX , ... |
| Instruments | ■ <i>RXTE, NuSTAR, Suzaku, XMM-Newton, Chandra, NICER, Swift, AstroSAT, IXPE, Einstein Probe, POLIX, ...</i> |
| Misc. | ■ Academic research, teaching, training, consultation, \LaTeX typesetting and publishing. |

Miscellaneous






Referee

- MNRAS ■ Provided peer-review of manuscripts submitted to the Monthly Notices of the Royal Astronomical Society (MNRAS) journal.
- JoAA ■ Provided peer-review of manuscripts submitted to the Journal of Astrophysics and Astronomy (JoAA) journal.

Miscellaneous (continued)

- uGMRT  Reviewer of observation proposals for the upgraded Giant Meterwave Radio Telescope (uGMRT).
- ESO  Reviewer of observation proposals for the European Southern Observatory (ESO).

Teaching/Mentorship

-  Teaching Assistant (TA) for the course "Introduction to Astronomy and Astrophysics" at IUCAA, Pune
-  X-ray Astronomy and Data Analysis lecture for the course "Astronomy Techniques" at IUCAA, Pune
-  Advised Undergraduate student during Summer Project at the University of Delhi, Delhi, India (May-August 2016)
-  Mentored Undergraduate student for Visiting Student Program (VSP) at RRI, Bangalore (May-June 2023)
-  Advising PhD students about X-ray Astrophysics, data analysis and techniques.