Vivek Kumar **Jha**

Postdoctoral Fellow

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Research Interests

• Active galactic nuclei • Quasar accretion disks • AGN multi-wavelength variability • Reverberation Mapping • Supermassive Black Holes • Light curve modelling • Survey Science.

Experience

Postdoctoral Fellow — *Pune, India*
National Centre for Radio Astrophysics - Tata Institute Of Fundamental Research (NCRA-TIFR) — *Jul 2024 - present*

Postdoctoral Fellow — *Manipal, India*
Manipal Centre for Natural Sciences (MCNS) — *Dec 2023 - Jun 2024*

Project Associate (Scientific) — *Nainital, India*
Aryabhatta Research Institute of Observational Sciences (ARIES) — *Apr 2022 - Oct 2023*

Senior Research Fellow (SRF) — *Nainital, India*
Aryabhatta Research Institute of Observational Sciences (ARIES) — *Mar 2020 - Jul 2021*

Junior Research Fellow (JRF) — *Nainital, India*
Aryabhatta Research Institute of Observational Sciences (ARIES) — *Mar 2018 - Feb 2020*

Education

Doctor of Philosophy (Ph.D.) in Astrophysics — *Nainital, India*
Aryabhatta Research Institute of Observational Sciences (ARIES) — *2018- 2023*

- Awarded by: Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur (Feb 2024)
- Thesis title : Investigating the Nature and Structure of the Inner Regions in Active Galactic Nuclei.
- Supervised by: Prof. Hum Chand and co-supervised by Prof. Shantanu Rastogi.

Master of Science (M.Sc.) in Physics — *Varanasi, India*
Banaras Hindu University — *2015-2017*

- Passed with first class and specialization in Space physics.
- Dissertation titled: *Study of properties of CsI as a photo cathode for UV astronomy purposes.*
- Supervised by: Prof. B.K. Singh.

Bachelor of Science (B. Sc.) with Honors in Physics — *New Delhi, India*
University of Delhi — *2011-2014*

- College: Deshbandhu College. Passed with first class.

Technical Skills

Fluent in PYTHON and working knowledge of IDL • Usage of Git version control • Data reduction using IRAF and Astropy packages including CCDPROC, PHOTUTILS, etc. • Developed a custom photometry pipeline in PYTHON language • Usage of LaTeX, HTML and Markdown • Development and maintenance of static websites • OS Used: Linux/ Windows.

Telescope Experience

Observed extensively using ARIES 1.04m, 1.3m, and 3.6m optical telescopes (approximately 100 nights cumulative) • Remotely observed data handled from the Thai Robotic Telescopes (TRT) and the Growth India Telescope (GIT) • Developed a common standard for the 1.3m DFOT data from 2012-present as part of the ARIES telescope archive • Experience working with multiple archival data sets.

Teaching/Mentoring Experience

- **2024:** Teaching assistant for the course: *Introduction to Astrophysics* for MSc. and First year PhD students at MCNS, Manipal.
- **2023:** Partial guidance to Mr. Jayesh Saraswat for his M Sc. dissertation at SPPU, Pune.
- **2022:** Mentored a group of 6 students selected from various universities during ARIES Training School on Observational Astronomy (ATSOA) in May 2022.
- **2021:** Guided M Sc. dissertation of Mr. Dharmendra at CUHP, Dharamshala
- **2019:** Mentored a group of 7 students selected from various universities during ARIES Training School on Observational Astronomy (ATSOA) in March 2019.

Professional Memberships

- Member of the Rubin-LSST Galaxies Science Collaboration.
- Student member of the Astronomical Society of India (ASI).

Awards/Fellowships

- **2023**: Financial support to attend a conference in Italy under the International Travel Support (ITS) scheme from the Department of Science and Technology, Government of India.
- **2018**: Junior Research Fellowship (JRF) from the Department of Science and Technology, Government of India.
- **2017**: Selected for Visiting student Internship program at the Indian Institute of Astrophysics (IIA).
- **2017**: Qualified Graduate Aptitude in Engineering (GATE): Physics.
- **2017**: Qualified Joint Entrance Screening Test (JEST): Physics. This exam is conducted for admission to Ph.D. in various research institutes in India.
- **2016**: Indian Space Research Organisation (ISRO) sponsored Space Science Promotion Scheme (SSPS) Fellowship for 1 year.

Organizational Roles

- **2024:** Part of the Scientific Organizing Committee for **Young Astronomers' Meet (YAM)** held at CHRIST, Deemed to be University, Bengaluru from 06-09 March 2024.
- **2022:** Chair of the Organizing Committee for **Young Astronomers' Meet (YAM)** held at ARIES Nainital from 09-13 November 2022.
- **2021:** Co-founded a web portal named **CosmicVarta**, a platform to present simplified versions of research articles in astrophysics to the general public.
- **2021:** Helped in organizing the **ARIES National Science Day celebrations** (28 February) held online.
- **2020:** Helped in organizing the **ARIES e-lecture series** in place of the ARIES Training School on Observational Astronomy (ATSOA), which was cancelled due to the COVID-19 pandemic.

Academic Visits

- Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune; India (Oct-Nov 2023).
- Central University of Himachal Pradesh (CUHP), Dharamshala; India (Aug 2021- Feb 2022).
- Kodaikanal Observatory, Indian Institute of Astrophysics (IIA), Bengaluru; India as part of the Visiting Student Internship Program (Sep 2017 - Feb 2018).

Accepted Telescope Proposals

- GROWTH India Telescope (GIT) **Accretion disk reverberation mapping of AGN using the GROWTH telescope GROWTH-ADRM**, cycle 2022-C1, 2022-C2, 2022-C3, 2023-C1 and 2023-C2 as Co-I. PI: Ravi Joshi.
- 1.3m J C Bose Telescope (JCBT). **Photometric Reverberation Mapping of the low luminosity AGNs** , cycle 2022-C1 as Co-I. PI: Ravi Joshi.
- 3.6m Devasthal Optical Telescope (DOT). **In search of luminous Quasars at the cosmic dawn**, cycle: 2020-C2, as PI.
- 3.6m Devasthal Optical Telescope (DOT). **Host galaxy imaging of γ ray detected Narrow-line Seyfert 1 (γ NlSy1) galaxies.** cycle 2020-C2, 2021-C1, 2021-C2 as Co-I. PI: Vineet Ojha
- VLT-ESO. **Dissecting baryon cycle in overdense environments**, cycle: P106 as Co-I. PI: Ravi Joshi
- 1.04m Sampurnanand telescope (ST). **Intra-night polarization variability of γ ray detected narrow-line Seyfert 1 galaxies.** cycle 2020 (B) as PI.
- 1.04m Sampurnanand telescope (ST). **Changing look Active Galaxies: Unraveling the AGN host and the role of environment in triggering AGN activity.**, cycle 2020 (B) as PI.
- Thai Robotic Telescope (TRT). **Photometric reverberation mapping of the accretion disk in AGN**, cycles: 8A, 7D and 7C as PI.
- ASTROSAT. **Accretion disk reverberation mapping of MRK 817 using Astrosat**, cycle: A11 as PI.

- 1.3m Devasthal Fast Optical telescope (DFOT). **Photometric Reverberation Mapping of the central region of AGN using H-beta emission line**, cycles: 2019 (A), 2019 (B) and 2020 (A), as PI
- 1.04m Sampurnanand telescope (ST). **Multi-wavelength photometric observations of a few Low Red-Shift Broad Line Seyfert 1 Galaxies**, cycles: 2018 (B), 2019 (A), and 2020 (A), as PI

Conferences/Meetings/Seminars

- **2024** Presented a *talk* titled: **Unveiling the diversity in AGN population based on X-ray observations** at the conference titled: Advancements in AGN, Galaxy Cluster, and IGM Research, held at CUHP, Dharamshala, India (29-31 March, 2024). [link]
- **2024** Presented a *poster* titled: **Optical/UV Variability of a large AGN sample using ZTF survey** at the 42nd meeting of the Astronomical Society of India (ASI) held at IISc.-Bengaluru, India (31 January-04 February 2024).[link]
- **2024** Presented a *talk* titled: **The connection between UV/Optical Variability and Physical Characteristics of X-ray-Selected Type 1 AGN** at the Regional Astronomers' Meet (RAM)-2024 at MCNS, Manipal, India (10-12 January, 2024). [link]
- **2023** Presented a *talk* titled: **Unveiling the Diverse Nature of the Inner Regions of AGNs through Variability** at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India (28 November 2023).
- **2023** Presented an *online talk* titled: **Exploring the Connection between UV/Optical Variability and Physical Characteristics of X-ray-Selected Type 1 AGN** at the Asia-Pacific Regional IAU Meeting (APRIM) held in Fukushima Prefecture; Japan (07-11 August, 2023).[link]
- **2023** Presented an *online talk* titled: **Tools of optical photometry: data reduction and aperture photometry using Python tools.** at the conference titled: Multidisciplinary Approach to Understand the Mysteries of our Universe, held at National Institute of Technology (NIT) Rourkela, India (17-21 July 2023).[link]
- **2023** Presented a *poster* titled: **Unveiling the Connection between Variability and Physical Characteristics of Type 1 AGN** at the international conference titled: The Restless nature of AGN: 10 years later, held in Naples; Italy (26-30 June, 2023).[link]
- **2023** Presented a *talk* titled: **Accretion disk size measurements for AGN using reverberation mapping** at the 3rd BINA Workshop: Scientific potential of the Indo-Belgian cooperation, held at the Graphic Era Hill University, Bhimtal, India (22-24 March, 2023).[link]
- **2023** Presented a *talk* titled: **New Accretion disk size measurements for reverberation mapped AGN.** at the 41st meeting of the Astronomical Society of India (ASI) held at IIT-Indore, India (01-05 March 2023).[link]
- **2023** Presented an *online talk* titled: **Eyes on the Sky: Current and upcoming telescopes of this decade.** at Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur, India (06 Jan 2023).
- **2022** Presented a *talk* titled: **Introduction to CosmicVarta: Platform for promoting Indian astronomy research to the public.** at ARIES Training School in Observational Astronomy, Nainital, India (16-27 May 2022).[link]

- **2022** Presented a *talk* titled: **Tools of Optical Photometry** at ARIES Training School in Observational Astronomy, Nainital, India (16-27 May 2022).[link]
- **2022** Presented a *poster* titled: **Accretion disk sizes for Quasars selected from the Zwicky Transient Facility survey** at the 40th meeting of the Astronomical Society of India (ASI) held at IIT-Roorkee, India (24-29 March 2022).[link]
- **2022** Presented a *talk* titled: **A look into the heart of Quasars: using light echos as a tool** at Central University of Himachal Pradesh (CUHP), Dharamshala; India on 3rd February. [link]
- **2021** Presented an *e-poster* titled: **Correlation analysis on a homogeneous sample of NlSy1 and BlSy1 galaxies** at the workshop titled "Multi-object Spectroscopy for Statistical Measures of Galaxy Evolution" held online by Space Telescope Science Institute (STScI), Baltimore; USA (17-20 May 2021). [link]
- **2020** Presented an *online talk* titled: **A comparative study of Narrow and Broad-line Seyfert galaxies using SDSS** at an international symposium titled "Astronomical Surveys and Big Data 2 (ASBD-2)" held online by the Byurakan Astrophysical Observatory (BAO); Armenia (14-18 September 2020) [link]
- **2019** Presented a *poster* titled: **Devasthal Optical Telescope-AGN Reverberation Monitoring (DOT-ARM): Project strategy and initial results** at the international conference titled "Mapping Central Regions of Active Galactic Nuclei" held in Guilin, Guanxi Province; China (19-24 September 2019). [link]

SCHOOLS/WORKSHOPS ATTENDED:

- **2021** Attended International Summer School on **The Interstellar Medium of Galaxies, from the Epoch of Reionization to the Milky Way**, held online from July 12-23, 2021. [link]
- **2020** Attended workshop titled: **Less traveled path of dark matter: Axions and primordial black holes**, held online by ICTS-TIFR; India between November 9-13, 2020. [link]
- **2020** Attended **ILMT: International Liquid Mirror Telescope workshop** held online by ARIES, Nainital; India (29 June - 01 July 2020). [link]
- **2020** Attended one day Indo Thai Workshop titled **Investigating the Stellar Variability and Star Formation** held in ARIES, Nainital; India (02 March 2020). [link]
- **2019** Attended **I-TMT (India- TMT) Science and Instruments Workshop** held in ARIES, Nainital; India (17 - 19 October 2019). [link]

Publications

Click here to visit the ADS link to my publications.

REFEREED

1. **Vivek Kumar Jha**, Ravi Joshi, Jayesh Saraswat, Hum Chand, Sudhanshu Barway and Amit Kumar Mandal; Exploring the AGN Accretion Disks using Continuum Reverberation Mapping. *Bulletin of Liège Royal Society of Sciences, 93(2), 766–779, 2024.*
2. **Vivek Kumar Jha**, Ravi Joshi, Hum Chand, Xue-Bing Wu, Luis C Ho, Shantanu Rastogi, Quinchun Ma; Accretion Disk Sizes from Continuum Reverberation Mapping of AGN Selected from the ZTF Survey. *Monthly Notices of the Royal Astronomical Society, Volume 511, Issue 2, 2022.*

3. **Vivek Kumar Jha**, Hum Chand, Vineet Ojha, Amitesh Omar, and Shantanu Rastogi; A comparative study of the physical properties for a representative sample of Narrow and Broad-line Seyfert galaxies. *Monthly Notices of the Royal Astronomical Society, Volume 510, Issue 3, 2022.*
4. **Vivek Kumar Jha**, Hum Chand, and Vineet Ojha; Properties of Broad and Narrow Line Seyfert galaxies selected from SDSS. *Communications of the Byurakan Astrophysical Observatory (Com-BAO), Volume 67, Issue 2, 2020.*
5. **Vivek Kumar Jha**, Nabeel Jammal, Triloki and B K Singh; Optical properties of "as-deposited" CsI photocathode in the VUV-UV spectral range. *Proceedings of the DAE Symposium on Nuclear Physics Volume 62, pp:1082, 2017.*
6. Vineet Ojha,**Vivek Kumar Jha**, Hum Chand, Veeresh Singh; Evidence of Jet induced Optical Microvariability in Radio-loud Narrow Line Seyfert 1 Galaxies. *Monthly Notices of the Royal Astronomical Society, Volume 514, Issue 4, 2022.*
7. Ailawadhi, Bhavya (et al. including **Vivek Kumar Jha**); Photometric and Spectroscopic Analysis of the Type II Short Plateau SN 2020jfo. *Monthly Notices of the Royal Astronomical Society, Volume 519, Issue 1, 2023.*
8. Nabeel Jammal, Richa Rai, Triloki, **Vivek Kumar Jha** and B.K. Singh; The impact of humidity and film thickness on photoemission, optical and morphological properties of CsI thin film photocathodes. *Thin Solid Films, Volume 674, pp:82-90, 2019.*

Non-refereed

1. Pandey, Ashwani; Sarswat, Jayesh; Joshi, Ravi; **Jha, Vivek Kumar**; Wani,Kiran; Optical brightening of BL Lacertae observed on 26 October and 02 November 2022 *The Astronomer's Telegram 15749, 2022*.
2. Dimple, Gupta R., **Jha V. K.**, Aryan A., Ghosh A., Misra K., Kumar A., et al., 2020; GRB 200122A: Optical upper limit GCN, 26870.

Under preparation

1. **Vivek Kumar Jha**, Ravi Joshi, Hum Chand; Unveiling the Connection between UV/Optical Variability and Physical Characteristics of X-ray-Selected Type 1 AGN