Vivek Kumar **Jha**

Postdoctoral Fellow

NCRA-TIFR, Pune; India 411007.

(+91) 9889 835 688 | vivekjha.aries@gmail.com | viveikjha.github.io | viveikjha

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*

- Thesis: *Investigating the Nature and Structure of the Inner Regions in Active Galactic Nuclei.*
- Awarded by **Deen Dayal Upadhyaya Gorakhpur University**, Gorakhpur (Feb 2024).
- Advisors: Prof. **Hum Chand** (Supervisor) and Prof. **Shantanu Rastogi** (Co-supervisor).

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

- First-class graduate with specialization in **Space Physics**.
- Dissertation: *Study of Properties of CsI as a Photocathode for UV Astronomy Purposes.*
- Advisor: Prof. **B.K. Singh**.

Bachelor of Science (B.Sc.) (Hons.) in Physics — *New Delhi, India*
University of Delhi — *2011–2014*

- Graduated with **First Class** from Deshbandhu College.

Technical Skills

- Proficient in **Python**; working knowledge of **IDL**.
- Experience with Git for version control.
- Data reduction using **IRAF** and **Astropy** packages (including `CCDPROC`, `PHOTUTILS`, etc.)
- Developed a custom photometry pipeline in **Python**.
- Proficient in LaTeX, HTML, and Markdown.
- Experience in developing and maintaining static websites.
- Operating Systems: **Linux**, **Windows**.

Telescope Experience

- Extensive observational experience with **ARIES** 1.04m, 1.3m, and 3.6m optical telescopes (~100 nights cumulative).
- Remote observation experience with **Thai Robotic Telescopes (TRT)** and **Growth India Telescope (GIT)**.
- Experience working with **archival data**, including **SDSS, ZTF, HSC-SSP, and SWIFT** datasets.

Professional Memberships

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

Awards & Fellowships

- **2023:** Awarded *International Travel Support (ITS)* by DST, Govt. of India, for a conference in Italy.
- **2018:** Junior Research Fellowship (JRF), DST, Govt. of India.
- **2017:** Selected for Visiting Student Internship Program, Indian Institute of Astrophysics (IIA).
- **2017:** Qualified **Graduate Aptitude Test in Engineering (GATE)** – Physics.
- **2017:** Qualified **Joint Entrance Screening Test (JEST)** – Physics, an entrance exam for Ph.D. programs in Indian research institutes.
- **2016:** Awarded *Space Science Promotion Scheme (SSPS)* Fellowship by ISRO (1 year).

Teaching & Mentoring Experience

- **2024:** Judge at Kendriya Vidyalaya (KV) Regional Science Exhibition, Pune (about 300 student projects from 69 schools).
- **2024:** Teaching Assistant for *Introduction to Astrophysics* (M.Sc. & Ph.D.), MCNS, Manipal.
- **2023:** Co-supervised M.Sc. dissertation of Mr. Jayesh Saraswat, SPPU, Pune.
- **2022:** Mentored 6 students during ARIES Training School on Observational Astronomy (ATSOA), May 2022.

- **2021:** Supervised M.Sc. dissertation of Mr. Dharmendra, CUHP, Dharamshala.
- **2019:** Mentored 7 students at ATSOA, March 2019.

Organizational Roles

- **2024:** SOC member, **Young Astronomers' Meet (YAM)**, CHRIST University, Bengaluru (06-09 Mar 2024). [link]
- **2024:** Responsblity for organizing scientific seminars at MCNS, Manipal (Feb-Jun 2024).
- **2022:** Chair, **YAM**, ARIES Nainital (09-13 Nov 2022). [link]
- **2021:** Co-founded **CosmicVarta**, web portal for public astrophysics outreach. [link]
- **2021:** Helped in organizing **ARIES National Science Day** events, online (28 Feb). [link]
- **2020:** Helped in organizing **ARIES e-lecture series**, in lieu of ATSOA due to COVID-19. [link]

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* (Cycles 2022-C1, C2, C3, 2023-C1, C2) – Co-I, PI: Ravi Joshi.
- **1.3m J C Bose Telescope (JCBT)**: *Photometric reverberation mapping of low-luminosity AGNs* (Cycle 2022-C1) – Co-I, PI: Ravi Joshi.
- **3.6m Devasthal Optical Telescope (DOT)**:
  - *In search of luminous quasars at the cosmic dawn* (Cycle 2020-C2) – PI.
  - *Host galaxy imaging of γ-ray detected NlSy1 galaxies* (Cycles 2020-C2, 2021-C1, C2) – Co-I, PI: Vineet Ojha.
- **VLT-ESO**: *Dissecting baryon cycle in overdense environments* (Cycle P106) – Co-I, PI: Ravi Joshi.
- **1.04m Sampurnanand Telescope (ST)**:
  - *Intra-night polarization variability of γ-ray detected NlSy1 galaxies* (Cycle 2020-B) – PI.
  - *Changing look active galaxies: AGN host and environment's role* (Cycle 2020-B) – PI.
  - *Multi-wavelength photometry of low-redshift BL Sy1 galaxies* (Cycles 2018-B, 2019-A, 2020-A) – PI.
- **Thai Robotic Telescope (TRT)**: *Photometric reverberation mapping of AGN accretion disk* (Cycles 8A, 7D, 7C) – PI.
- **ASTROSAT**: *Accretion disk reverberation mapping of MRK 817* (Cycle A11) – PI.

- **1.3m Devasthal Fast Optical Telescope (DFOT)**: *Photometric reverberation mapping using H-beta emission* (Cycles 2019-A, 2019-B, 2020-A) – PI.

Conferences/Meetings/Seminars

Presentations:

2025
- *Talk*: **Probing the Drivers of Optical Variability in Active Galactic Nuclei** at the 6th REcent Trends in the study of Compact Objects (RETCO) Meeting, IIT-Indore, India (10 - 12 Mar). [link]
- *Talk*: **AGN Variability: A window into accretion dynamics and black hole physics** at the annual academic day, NCRA-TIFR, India (10th Mar).
- *Talk*: **Investigating the Nature and Structure of the Inner Regions in Active Galactic Nuclei (*thesis*).** at 43rd Astronomical Society of India Meeting (ASI), NIT-Rourkela, India (15 - 19 Feb). [link]

2024
- *Talk*: **Unveiling the diversity in AGN population based on X-ray observations** at Advancements in AGN, Galaxy Cluster, and IGM Research, CUHP, Dharamshala, India (29-31 Mar). [link]
- *Poster*: **Optical/UV Variability of a large AGN sample using ZTF survey** at 42nd Astronomical Society of India Meeting (ASI), IISc.-Bengaluru, India (31 Jan-04 Feb). [link]
- *Talk*: **The connection between UV/Optical Variability and Physical Characteristics of X-ray-Selected Type 1 AGN** at Regional Astronomers' Meet (RAM)-2024, MCNS, Manipal, India (10-12 Jan). [link]

2023
- *Talk*: **Unveiling the Diverse Nature of the Inner Regions of AGNs through Variability** at IUCAA, Pune, India (28 Nov).
- *Online Talk*: **Exploring the Connection between UV/Optical Variability and Physical Characteristics of X-ray-Selected Type 1 AGN** at Asia-Pacific Regional IAU Meeting (APRIM), Fukushima, Japan (07-11 Aug). [link]
- *Online Talk*: **Tools of optical photometry: data reduction and aperture photometry using Python tools** at Multidisciplinary Approach to Understand the Mysteries of our Universe, NIT Rourkela, India (17-21 Jul). [link]
- *Poster*: **Unveiling the Connection between Variability and Physical Characteristics of Type 1 AGN** at The Restless Nature of AGN: 10 Years Later, Naples, Italy (26-30 Jun). [link]
- *Talk*: **Accretion disk size measurements for AGN using reverberation mapping** at 3rd BINA Workshop, Graphic Era Hill University, Bhimtal, India (22-24 Mar). [link]
- *Talk*: **New Accretion disk size measurements for reverberation mapped AGN** at 41st ASI Meeting, IIT-Indore, India (01-05 Mar). [link]
- *Online Talk*: **Eyes on the Sky: Current and upcoming telescopes of this decade** at Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur, India (06 Jan).

2022
- *Talk*: **Introduction to CosmicVarta: Platform for promoting Indian astronomy research to the public** at ARIES Training School in Observational Astronomy, Nainital, India (16-27 May). [link]

- *Talk*: **Tools of Optical Photometry** at ARIES Training School, Nainital, India (16-27 May). [link]
- *Poster*: **Accretion disk sizes for Quasars selected from the Zwicky Transient Facility survey** at 40th ASI Meeting, IIT-Roorkee, India (24-29 Mar). [link]
- *Talk*: **A look into the heart of Quasars: using light echos as a tool** at Central University of Himachal Pradesh (CUHP), Dharamshala, India (03 Feb). [link]

2021 – *e-Poster*: **Correlation analysis on a homogeneous sample of NlSy1 and BlSy1 galaxies** at "Multi-object Spectroscopy for Statistical Measures of Galaxy Evolution," STScI, Baltimore, USA (17-20 May). [link]

2020 – *Online Talk*: **A comparative study of Narrow and Broad-line Seyfert galaxies using SDSS** at "Astronomical Surveys and Big Data 2 (ASBD-2)," BAO, Armenia (14-18 Sep). [link]

2019 – *Poster*: **Devasthal Optical Telescope-AGN Reverberation Monitoring (DOT-ARM): Project strategy and initial results** at "Mapping Central Regions of Active Galactic Nuclei," Guilin, China (19-24 Sep). [link]

OTHER WORKSHOPS AND CONFERENCES:

2025 – **AI/ML Applications in Astronomy & Astrophysics**, IUCAA, Pune, India (6 - 10 Jan). [link]

2024
- **LSST @ Europe 6**, La Palma, Canary Islands, Spain (online) (16-20 Sep). [link]
- **Pune Mumbai Cosmology and Astro-Particle meeting**, TIFR, Mumbai, India (13-14 Sep). [link]
- **Rubin/LSST community workshop**, SLAC, Menlo Park, California, USA (online) (22-26 July). [link]

2021 – *International Summer School*: **The Interstellar Medium of Galaxies, from the Epoch of Reionization to the Milky Way**, online (12-23 Jul). [link]

2020
- **ILMT: International Liquid Mirror Telescope Workshop**, ARIES, Nainital, India (29 Jun-01 Jul). [link]
- **Investigating the Stellar Variability and Star Formation**, ARIES, Nainital, India (2 Mar). [link]

2019 – **I-TMT (India-TMT) Science and Instruments Workshop**, ARIES, Nainital, India (17-19 Oct). [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. 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.*

3. 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.*

4. **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.*

5. **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.*

6. **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.*

7. 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.*

8. **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.*

Submitted

1. **Vivek Kumar Jha**, Debbijoy Bhattacharya and Hum Chand; Exploring the Origins of Optical Variability in AGNs: Correlations with Black Hole Properties, X-ray, and Radio Emission. (*submitted to ApJ*)

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.