

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

NATIONAL CENTRE FOR RADIO ASTROPHYSICS - TATA INSTITUTE OF FUNDAMENTAL RESEARCH (NCRA-TIFR)

Pune, India

Jul 2024 - present

Postdoctoral Fellow

MANIPAL CENTRE FOR NATURAL SCIENCES (MCNS)

Manipal, India

Dec 2023 - Jun 2024

Project Associate (Scientific)

ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONAL SCIENCES (ARIES)

Nainital, India

Apr 2022 - Oct 2023

Senior Research Fellow (SRF)

ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONAL SCIENCES (ARIES)

Nainital, India

Mar 2020 - Jul 2021

Junior Research Fellow (JRF)

ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONAL SCIENCES (ARIES)

Nainital, India

Mar 2018 - Feb 2020

Education

Doctor of Philosophy (Ph.D.) in Astrophysics

ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONAL SCIENCES (ARIES)

Nainital, India

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

BANARAS HINDU UNIVERSITY

Varanasi, India

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

UNIVERSITY OF DELHI

New Delhi, India

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:** SOC member, **Young Astronomers' Meet (YAM)**, CHRIST University, Bengaluru (06-09 March 2024). [link]
- **2022:** Chair, **YAM**, ARIES Nainital (09-13 November 2022). [link]
- **2021:** Co-founded **CosmicVarta**, web portal for public astrophysics outreach. [link]
- **2021:** Helped in organizing **ARIES National Science Day** events, online (28 February). [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:

- 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). [\[link\]](#)

ATTENDANCE:

- 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 (ComBAO)*, 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.*

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**, et al.; Exploring the Origins of Optical Variability in AGNs: Correlations with Black Hole Properties, X-ray, and Radio Emission.