

# 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

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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  $\text{\LaTeX}$ , HTML and Markdown • Development and maintenance of static websites • OS Used: Linux/ Windows.

## Telescope Experience

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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

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- **2024:** One of the Judges at the Science Exhibition (KV Regional Rashtriya Bal Vaigyanik Pradarshani), an event showcasing nearly 300 scientific projects by students from 69 schools at Kendriya Vidyalaya, Ganeshkind, Pune, India.
- **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

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

## Awards/Fellowships

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- **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

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- **2024:** SOC member, **Young Astronomers' Meet (YAM)**, CHRIST University, Bengaluru (06-09 Mar 2024). [link]
- **2024:** Responsibility 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

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- 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

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- **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  $\gamma$ -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  $\gamma$ -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

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

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

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[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.

#### 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.