

# Sadhana Singh, Ph.D.

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## Designation:

Assistant Professor

## Affiliation:

Maulana Azad National Institute of Technology (MANIT), Bhopal-462003, India

## Area of Research Interest:

Interstellar Medium, Molecular clouds, Star-forming regions, Open Star Clusters, Interstellar Dust Grains.



## Employment History




- November, 2024 – . . . . . **Assistant Professor**, Maulana Azad National Institute of Technology (MANIT), Bhopal, India.
- January, 2023 – October, 2024 **Post Doctoral Fellow**, Physical Research Laboratory (PRL), Ahmedabad, India.
- June, 2022 – December, 2022 **Post Doctoral Fellow**, Aryabhata Research Institute of Observational Sciences (ARIES), Nainital, India.

## Education







- 2016 – 2022, 2023 **Ph.D. - Astronomy & Astrophysics**, Aryabhata Research Institute of Observational Sciences (ARIES), Nainital, India.  
Thesis title: *Dust Properties Toward Galactic Anti-Center Direction*  
Thesis Supervisor: *Dr. Jeewan C. Pandey*
- 2014 – 2016 **M.Sc. - Physics**, Banaras Hindu University, Varanasi, India.  
Dissertation title: *Hydrogen Storage*.
- 2011 – 2014 **B.Sc. - Physics, Mathematics**, University of Allahabad, Prayagraj, India.
- 2011 **Intermediate. - Physics, Mathematics, Chemistry, Hindi, English**, Uttarakhand Board of School Education, Uttarakhand, India.
- 2009 **Highschool. - Science, Mathematics, Hindi, English, Social Science**, Uttarakhand Board of School Education, Uttarakhand, India.

## Research Publications

- 1 J. C. Pandey, N. Rawat, S. M. Rao, A. Joshi, and **S. Singh**, "X-ray Observations of the Intermediate Polar TX Col," *Bulletin de la Societe Royale des Sciences de Liege (BSRSL)*, vol. 93, no. 2, pp. 243–249, Jun. 2024. [DOI: 10.25518/0037-9565.11662](#). arXiv: 2309.03674 [astro-ph.HE].
- 2 **S. Singh**, J. C. Pandey, T. Hoang, *et al.*, "Foreground Dust Properties toward the Cluster NGC 7380," *The Astronomical Journal (AJ)*, vol. 167, no. 5, 242, p. 242, May 2024. [DOI: 10.3847/1538-3881/ad36c3](#). arXiv: 2403.20043 [astro-ph.GA].
- 3 **S. Singh**, J. C. Pandey, and V. Joshi, "Polarimetric Approach Towards Membership Probability of Open Star Cluster NGC 2345," *Bulletin de la Societe Royale des Sciences de Liege (BSRSL)*, vol. 93, no. 2, pp. 308–314, Jun. 2024. [DOI: 10.25518/0037-9565.11691](#). arXiv: 2308.08150 [astro-ph.SR].
- 4 J. C. Pandey, **S. Singh**, R. K. S. Yadav, *et al.*, "Upgradation of AIMPOL Instrument on the 104-cm Sampurnanand Telescope of ARIES," *Journal of Astronomical Instrumentation (JAI)*, vol. 12, no. 2, 2240008, p. 2 240 008, Jan. 2023. [DOI: 10.1142/S2251171722400086](#).



- 5 **S. Singh**, J. C. Pandey, and T. Hoang, "Polarization, polarizing efficiency, and grain alignment towards the direction of the cluster NGC 2345," *Monthly Notices of the Royal Astronomical Society (MNRAS)*, vol. 513, no. 4, pp. 4899–4912, Jul. 2022.  DOI: 10.1093/mnras/stac1211. arXiv: 2204.12864 [astro-ph.GA].
- 6 **S. Singh** and J. C. Pandey, "Broadband Linear Polarization in the Region of the Open Star Cluster NGC 1817," *The Astronomical Journal (AJ)*, vol. 160, no. 6, 256, p. 256, Dec. 2020.  DOI: 10.3847/1538-3881/abba29. arXiv: 2011.03309 [astro-ph.SR].
- 7 **S. Singh**, J. C. Pandey, R. K. S. Yadav, and B. J. Medhi, "Optical Linear Polarization toward the Open Star Cluster Casado Alessi 1," *The Astronomical Journal (AJ)*, vol. 159, no. 3, 99, p. 99, Mar. 2020.  DOI: 10.3847/1538-3881/ab6608. arXiv: 2001.11227 [astro-ph.GA].
- 8 **S. Singh**, J. C. Pandey, R. S. Yadav, B. J. Medhi, A. Joshi, and B. Arora, "Linear Polarization Towards Galactic Anticenter direction: the Case of Alessi," *Bulletin de la Societe Royale des Sciences de Liege (BSRSL)*, vol. 88, pp. 283–286, Oct. 2019.

## Skills





Operating Systems	 Linux and Windows.
Programming	 Python, FORTRAN, L <sup>A</sup> T <sub>E</sub> X, Linux Shell Scripting
Telescope Operations	 Well trained to make photometric and polarimetric observations with different telescopes.
Astronomical Data Handling	 Optical imaging; Optical linear polarimetric data; X-ray technique; Sub-mm polarimetric data.
Instrument data analyzed	 AIMPOL@ST_ARIES, ACIS@Chandra, ADFOSC@DOT_ARIES, FOC@2.5m_PRL, POL2-JCMT.
Software and tools	 SAO Image DS9, IRAF, DAOPHOT, CIAO, AstroImageJ, HEASoft

## Miscellaneous Experience

### Awards and Achievements


- 2023  **International Travel Support**, Science and Engineering Research Board (SERB), India.
- 2011  **INSPIRE Merit Certificate**, Scholarship for Higher Education.

### National level Exam Qualified

- 2016  **CSIR NET with JRF**, Council of Scientific and Industrial Research (CSIR), India.
-  **JEST**, Joint Entrance Screening test (JEST).
-  **GATE**, Graduate Aptitude Test in Engineering (GATE).
- 2015  **CSIR NET**, Council of Scientific and Industrial Research (CSIR), India.

## Paper presentation in National/International conference/workshop:



### Oral Presentation

- SAGI-2025  **Probing Magnetic Field and Grain Alignment in Serpens Main through JCMT/POL2 Polarization and in Open Clusters through Optical Polarization**, 'The 2025 SAGI Astrophysics Workshop', Vietnam, during 26 May - 30 May, 2025. (Invited Talk)





## Paper presentation in National/International conference/workshop: (continued)

- SAGI-2023  **Foreground Dust Properties towards the Cluster NGC 7380**, 'The 2023 SAGI Astrophysics Workshop on Dust Polarimetry and Applications in Astrophysics', Vietnam, during 26 November - 2 December, 2023.
- APRIM-2023  **Polarization, Polarizing Efficiency, and Grain alignment towards the direction of the cluster NGC 2345**, 'Asia-Pacific Regional IAU Meeting (APRIM-2023)', Koriyama, Japan, during 07-11 August, 2023.
- 2022  **Investigation of Dust Properties using Polarimetry**, '104-cm Sampuranand Telescope Golden Jubilee Workshop', ARIES, Nainital, during 17-19 October, 2022.
-  **Polarization, Polarizing Efficiency, and Grain alignment towards the direction of the cluster NGC 2345**, '3rd Meeting on Star Formation' ARIES, Nainital, during 04-07 May, 2022.
- RoboPol-2021  **Optical Polarization Study in Open Clusters** 'RoboPol- Looking at the Polarized Universe: Past, Present and Future', University of Crete, Heraklion, Greece, during 24-28 May, 2021.
- ISM-2021  **Polarimetric Study of Open Clusters toward Galactic Anti-center Direction**, 'ISM-2021, Structure, characteristic scales, and star formation', Beirut, during 11-14 May, 2021.
- ASI-2021  **A Multi-Band Linear Polarimetric Study Toward Cluster NGC 2345**, 'Astronomical Society of India (ASI) 2021', during 18-23 February, 2021.
- Gaia-2020  **Optical Linear Polarization Towards the Open Star Cluster Casado Alessi 1**, 'Gaia Symposium: DR2 and Beyond', during November 2 - 6, 2020.
- ICDA-2020  **Polarimetric Study Toward Open Star cluster NGC 1817**, 'International Conference on Dust in Astrophysics (ICDA-2020)' Assam University, Silchar, during August 31 - September 1, 2020.
- YAM-2019  **Linear Polarization Towards Galactic Anti-Center Direction: NGC 1817**, 'Young Astronomers Meet 2019', Kodaikanal Solar Observatory, Kodaikanal, during 23-27 September 2019.











## Poster Presentation

- BINA-2023  **Polarimetric Approach towards Membership Probability**, '3rd Belgo-Indian Network for Astronomy & Astrophysics (BINA) Workshop', Graphic Era Hill University, Bhimtal, during 22-24 March, 2023.
- ASI-2022  **Polarization, Polarizing Efficiency, and Grain alignment towards the direction of the cluster NGC 2345**, 'Astronomical Society of India (ASI) 2022', IIT Roorkee, during 25-29 March, 2022.




## Paper presentation in National/International conference/workshop: (continued)

- ASI-2020     **Optical Polarimetric Study of Open Cluster NGC 1817**, 'Astronomical Society of India (ASI) 2020', Indian Institute of Science Education & Research (IISER) Tirupati, during 13 - 17, February, 2020.
- EXPUNIV-2018     **Linear Polarization Towards Open Star Cluster Alessi 1**, 'International conference on Exploring the Universe: Near Earth space science to extragalactic astronomy (EXPUNIV2018)', S. N. Bose National Centre for Basic Sciences, Kolkata, during 14-17 November, 2018.
- BINA-2018     **Linear Polarization Towards Open Star Cluster Alessi 1**, '2nd Belgo Indian Network for Astronomy & Astrophysics (BINA) Workshop', Belgium, during 09-12 October, 2018.
- ASI-2018     **Characterization of PyLoN CCD Camera**, 'Astronomical Society of India 2018', Hyderabad, during 05-09 February, 2018.

## Presentation at Institute/university

- 26 June 2025     'Probing Magnetic Field and Grain Alignment in Serpens Main through JCMT/POL-2 Polarization', Aryabhata Research Institute of Observational Sciences (ARIES), Nainital (**during 23-30 June 2025 visit**).
- 19 December 2023     'Multi-band Polarimetric Study towards the Cluster NGC 7380', Physical Research Laboratory (PRL), Ahmedabad.
- 15 September 2022     'Dust properties towards Galactic anti-center direction', PRL, Ahmedabad.
- 06 June 2022     SoS in Physics and Astrophysics of Pt. Ravishankar Shukla University.
- 30 January 2019     SoS in Physics and Astrophysics of Pt. Ravishankar Shukla University.
- 14 December 2021     'Dust Properties towards Galactic anti-center direction', Aryabhata Research Institute of Observational Sciences (ARIES), Nainital.
- 18 May 2021     'Astronomical Polarimetry', ARIES Training School of Observational Astronomy (ATSOA-2021), ARIES, Nainital.
- 22 May 2020     'Linear Polarimetric Study of Open Star clusters', ARIES, Nainital.
- 09 July 2019     'Interstellar Dust Grains', ARIES, Nainital.
- 31 December 2019     'Optical Linear Polarization Towards the Open Star Cluster Casado Alessi 1', ARIES, Nainital.

## Workshop Attended

- 2019     I-TMT Science and Instruments Workshop, held at ARIES, Nainital, from 17th October to 19th October 2019.
- 2017     ASSC Sponsored AstroSat Data Analysis Workshop, held at ARIES, Nainital, from 08th August to 11th August 2017.
- 2016     First Belgo-Indian Network for Astronomy & Astrophysics (BINA) workshop, held at ARIES, Nainital, from 15th November to 18th November 2016.