

# 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 – ....	 <b>Assistant Professor</b> , Maulana Azad National Institute of Technology (MANIT), Bhopal, India.
January, 2023 – October, 2024	 <b>Post Doctoral Fellow</b> , Physical Research Laboratory (PRL), Ahmedabad, India.
June, 2022 – December, 2022	 <b>Post Doctoral Fellow</b> , Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital, India.

## Education

2016 – 2022, 2023	 <b>Ph.D. - Astronomy &amp; Astrophysics</b> , Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital, India. Thesis title: <i>Dust Properties Toward Galactic Anti-Center Direction</i> Thesis Supervisor: <i>Dr. Jeewan C. Pandey</i>
2014 – 2016	 <b>M.Sc. - Physics</b> , Banaras Hindu University, Varanasi, India. Dissertation title: <i>Hydrogen Storage</i> .
2011 – 2014	 <b>B.Sc. - Physics, Mathematics</b> , University of Allahabad, Prayagraj, India.
2009	 <b>Intermediate. - Physics, Mathematics, Chemistry, Hindi, English</b> , Uttarakhand Board of School Education, Uttarakhand, India.
	 <b>Highschool. - Science, Mathematics, Hindi, English, Social Science</b> , 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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	 <b>International Travel Support</b> , Science and Engineering Research Board (SERB), India.
2011	 <b>INSPIRE Merit Certificate</b> , Scholarship for Higher Education.

### National level Exam Qualified

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

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

### Oral Presentation

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