Dr. Mayank Narang

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Education

- **Tata Institute Of Fundamental Research, Mumbai, India**

  Integrated Master's and Ph.D., 2015 - 2022.

  Cumulative Performance Index (CPI) for Master's 83.6/100

  Thesis advisor: Prof. Manoj Puravankara

  Thesis title: From Protostars to Exoplanets: Formation and Evolution of planetary systems

- **Sri Venkateswara College, University of Delhi, Delhi, India**

  B.Sc. (Physics) Hons, 89.7%, 2014.

Research Interest

Star and planet formation; Jets and outflows from young stellar objects (YSOs); Protostellar and Protoplanetary disks; Exoplanets; Star-planet Interaction (SPI); ISM and cloud chemistry; Astronomical instrumentation.

Skill sets

Python; Git-based programming; Extensive experience with imaging, spectroscopy, and IFU data from optical, NIR, MIR, and FIR telescopes; Working and development of JWST reduction pipeline; Experience with JWST and HST tools and packages such as Astronomers Proposal Tool, Exposure Time Calculator; Carta; CASA;

Selected large proposals

- PI of ALMA cycle-11 program on detecting protostellar outflow in CO 6-5 for the High Angular Resolution observations of Stellar Emergence in Filamentary Environments (HEFE) program
- Co-I in the Cycle 3 large GO JWST program High Angular Resolution observations of Stellar Emergence in Filamentary Environments (HEFE) totaling 175 hrs
- Co-I + leading MIRI data reduction for the Cycle 1 GO JWST program Investigating Protostellar Accretion (IPA) totaling 65 hrs

- PI of GMRT large program uGMRT Survey of EXoplanets Around M-dwarfs (GS-EXAM) and have been awarded 300+hrs to search for radio emission from nearby M dwarfs and brown dwarfs
- Co-PI of uGMRT Protostellar Survey (GPS) with 250+ hrs to observe radio emission from protostars and YSOs within 500 pc
- Co-I ALMA large program Early Planet Formation in Embedded Disks (eDisk) and leading the JWST + ALMA analysis

Selected Awards and Medals

Best paper presentation award
National Space Science Symposium, Pune, 2019

Award For Excellence for Departmental Topper B.Sc. (Physics) Hons,

- 2013-2014
- 2012-2013
- 2011-2012

Bharatula Savitri Memorial prize (For rank 1 in the department)
B.Sc. (Physics) Hons, 2013-2014

Sri Padmavati Ammavari medal (For rank 1 in the department)
B.Sc. (Physics) Hons, 2013-2014

Students mentored

- **Ayanabha De, 2023** (IIT Madras)
    - Investigating the solar neighborhood at 3 GHz with VLASS
- **Nitish Ujwal, 2019** (IIT Bombay)
    - A GMRT study of radio emission from exoplanets
- **Prachi Mishra, 2019** (Delhi University)
    - Mass-radius relation for exoplanets
- **Gayathri Viswanath, 2018** (Christ University Bangalore)
    - Star planet interaction in the UV domain

Refereed publications

First Author papers

1. A uGMRT search for radio emission from planets around evolved stars
   Mayank Narang, Manoj P, et al., **MNRAS 529 1161**

2. Discovery of a Collimated Jet from the Low-luminosity Protostar IRAS 16253-2429 in a Quiescent Accretion Phase with the JWST
   Mayank Narang, Manoj P et al. **2024 ApJ 962L 16**

3. Optical spectroscopy of Gaia detected protostars with DOT: Can we probe protostellar photospheres?
   Mayank Narang, Manoj P et al. **2023 Journal of Astrophysics and Astronomy, 44, 2, 92**

4. uGMRT observations of the hot-Saturn WASP-69b: Radio-Loud Exoplanet-Exomoon Survey II (RLEES II)
   Mayank Narang; Oza, Apurva V.; Hakim, Kaustub, Manoj P, et al., 2023, **MNRAS 522 1662**

5. Radio-loud Exoplanet-exomoon Survey: GMRT Search for Electron Cyclotron Maser Emission
   Mayank Narang ; Oza, Apurva V.; Hakim, Kaustub, Manoj P et al., **2023, AJ, 165, 1**

6. The nature of the radio source detected towards the exoplanet system 1RXS1609.1-210524
   Mayank Narang 2022, MNRAS, 515, 2015

7. In search of radio emission from exoplanets: GMRT observations of the binary system HD 41004
   Mayank Narang, Manoj P, et al. **2021, MNRAS, 500, 4818**

8. Properties and Occurrence Rates for Kepler Exoplanet Candidates as a Function of Host Star Metallicity from the DR25 Catalog
   Mayank Narang, P. Manoj, et al. **2018, AJ, 156, 221**

Papers with major contribution

1. Simultaneous FUV and NUV observations of T Tauri stars with UVIT/AstroSat: probing accretion process in young stars
   Nayak, P, **Mayank Narang** et al., **in press ApJ**

2. Host star properties of hot, warm and cold Jupiters in the solar neighborhood from Gaia DR3: clues to formation pathways
   Bihan B, **Mayank Narang** et al., **2023 AJ, 168, 7**

3. Identifying the population of T-Tauri stars in Taurus: UV-optical synergy
   Nayak, P, **Mayank Narang** et al., **2023 Journal of Astrophysics and Astronomy, 44, 2, 83**

4. Carbon abundance of stars in the LAMOST-Kepler field
   Athira Unni, **Mayank Narang**, T. Sivarani, P. Manoj, et al **2022, AJ, 164, 181**

5. A Statistical Search for Star-Planet Interaction in the Ultraviolet Using GALEX
   Viswanath, G., **Mayank Narang.**, Manoj, P., Blesson Mathew, Sreeja S Kartha, **2020, AJ, 159, 194**

Co-author papers

1. Why are (almost) all the protostellar outflows aligned in Serpens Main?
   Joel D. Green + **Mayank Narang in press ApJ**

2. Influence of Magnetic Field Morphology in Dense Cores on Sizes of Protostellar Disks
   Hsi-Wei Yen; Williams, Jonathan P.; + **Mayank Narang in press ApJ**

3. JWST detections of amorphous and crystalline HDO ice toward massive protostars
   Slavicinska K; van Dishoeck, Ewine F.; + **Mayank Narang under in press A&A**

4. Age Analysis of Extrasolar Planets: Insight from Stellar Isochrone Models
   C.Swastik, Ravinder K. Banyal, **Mayank Narang** et al., **2024 AJ 167 270**

5. JWST/MIRI detection of suprathermal OH rotational emissions: probing the dissociation of the water by Lyman alpha photons near the protostar HOPS 370
   David Neufeld, Manoj P, Tyagi Himanshu, **Mayank Narang** et al. **2024 ApJL 966 22**

6. Chandra X-ray analysis of Herbig Ae/Be stars
   Anilkumar, H., Mathew, B., + **Mayank Narang 2024 MNRAS 530 3020**

7. Investigating Protostellar Accretion-Driven Outflows Across the Mass Spectrum: JWST NIRSpec IFU 3-5 micron Spectral Mapping of Five Young Protostars
   Federman, Samuel, Megeath, Thomas ; + **Mayank Narang 2024 ApJ 966 41**

8. JWST observations of $^{13}CO_2$ ice: Tracing the chemical environment and thermal history of ices in protostellar envelopes
   Brunken, Nashanty, Rocha, Will R. M. + **Mayank Narang 2024 A&A 685 A27**

9. Hunt for complex cyanides in protostellar ices with JWST: Tentative detection of CH_3CN and C_2H_5CN
   Nazari, P. , Rocha, W. R. M + **Mayank Narang accepted at A&A**

10. MOIS: a configurable slit multi-object infrared spectrograph
    Surya A, Manoj P + **Mayank Narang, 2023 Proceedings of the SPIE, Volume 12677, id. 126770A 14 pp.**

11. Age distribution of exoplanet host stars: Chemical and Kinematics age proxies from GAIA DR3"
    C.Swastik, Ravinder K. Banyal, **Mayank Narang** et al., **2023 AJ 166 91**

12. UV Spectral Characterization of Low-mass Stars with AstroSat UVIT for Exoplanet Applications: The Case Study of HIP 23309
    Ranjan, S; Nayak, P; Pineda, J. S; **Mayank Narang 2023 AJ 166 70**

13. Fullerenes in the circumstellar medium of Herbig Ae/Be stars: insights from the Spitzer mid-infrared spectral catalog
R. Arun, Blesson Mathew, Manoj P + **Mayank Narang 2023 MNRAS 523 1601**

9. Extension of HOPS Out to 500 ParSecs (eHOPS). I. Identification and Modeling of Protostars in the Aquila Molecular Clouds
Pokhrel, Riwaj + **Mayank Narang 2023, ApJS, 266, 32P**

10. 300: An ACA 870 μm Continuum Survey of Orion Protostars and Their Evolution
Federman,S + **Mayank Narang 2023, ApJ, 944, 49**

11. Emission line star catalogues post-Gaia DR3. A validation of Gaia DR3 data using the LAMOST OBA emission catalogue
Shridharan, B + **Mayank Narang, 2022, A&A, 668, 156**

12. Chemical analysis of exoplanet host stars: Are high-mass planetary systems young?
C.Swastik, Ravinder K. Banyal **Mayank Narang** , P. Manoj, T. Sivarani, , S. P. Rajaguru, **2022, AJ, 164, 60**

13. The Rate, Amplitude and Duration of Outbursts from Class 0 Protostars in Orion
Wafa Zakri, S. T. Megeath + **Mayank Narang, 2022, ApJL, 924, 23**

14. Clustering of low-mass stars around Herbig Be star IL Cep - evidence of 'Rocket Effect' using Gaia EDR3?
R. Arun, Blesson Mathew, + **Mayank Narang, 2021, MNRAS, 507, 267**

15. Host star metallicity of directly imaged wide-orbit planets: implications for planet formation
C.Swastik, Ravinder K. Banyal, **Mayank Narang**, et al. **2021, AJ, 161, 114**

16. Discovery of an M-type Companion to the Herbig Ae Star V1787 Ori
R. Arun, Blesson Mathew, Sridharan Rengaswamy, P. Manoj, **Mayank Narang,** et al. **2021, MNRAS , 501, 124**

17. Analysis of Membership Probability in Nearby Young Moving Groups with Gaia DR2
K. Ujjwal, Sreeja S. Kartha, Blesson Mathew, P. Manoj, **Mayank Narang**, **2020, AJ, 159, 166**

18. On the Mass Accretion Rate and Infrared Excess in Herbig Ae/Be Stars
R. Arun, Blesson Mathew, P. Manoj, K. Ujjwal, Sreeja S. Kartha, Gayathri Viswanath, **Mayank Narang**, K.T. Paul **2019, AJ 157, 159**

19. Excitation mechanism of OI lines in Herbig Ae/Be stars
Mathew, Blesson, Manoj, P., **Mayank Narang**, et al. **2018, ApJ, 857, 30**

Papers under review

1. uGMRT Survey of EXoplanets Around M-dwarfs (GS-EXAM): Radio observations of GJ~1151
Mayank Narang et al., **under review AJ**

2. IPA. Class 0 Protostars Viewed in CO Emission Using JWST/NIRSpec
Rubinstein, Adam, Tyagi, Himanshu + **Mayank Narang under review ApJ**

3. HOPS 361-A: An Intermediate-Mass Protostar and its Outflow Cavity in NGC 2071 IR Karnath N +**Mayank Narang under review ApJ**

4. Light Shining Through Wall Bounds on Axions From Obscured Magnetars Chattopadhyay Dibya, Dasgupta Basudeb, Dighe Amol, **Mayank Narang under review PRD**

Non-refereed publications

1. Investigating Accretion onto Protostars: 25 Years of Infrared Observations from the Air and Space
   Megeath, Thomas + **Mayank Narang**, **Physics and Chemistry of Star Formation: The Dynamical ISM Across Time and Spatial Scales. Proceedings of the 7th Chile-Cologne-Bonn Symposium**

2. GMRT Observations of the Exoplanetary Systems τ Boötis and 55 Cancri
   Mayank Narang, Manoj, P., & Ishwara Chandra, C.~H. **2021, Research Notes of the American Astronomical Society, 5, 158.**

3. From the margins to the mainstream: Nobel celebrates exoplanets!
   Manoj, P., R. Banyal, **Mayank**. **Narang, 2019, Indian Physics Association Physics News, 49, 15**