

DWAIPAYAN DUBEY

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🌐 [dwaipayan-dubey](https://www.linkedin.com/in/dwaipayan-dubey)

🌐 [dubeydwaipayan.github.io](https://github.com/dubeydwaipayan)

EDUCATION

Dec 2022 -
present

Doctor of Philosophy in Physics

Ludwig-Maximilians-Universität München | Munich, Germany

Thesis: "Deciphering the Importance of Carbon Chemistry in Gas Giant and Sub-Neptune Atmospheres"

Supervisors: Prof. Barbara Ercolano & Dr. Karan Molaverdikhani

2017 - 2022

BS - MS Dual Degree in Physical Sciences, Minor in Chemical Sciences

Indian Institute of Science Education and Research Kolkata | India

CGPA: 9.31/10.0

Thesis: "Classification of Irradiated Exoplanets using Radiative - Convective and Chemical Equilibrium"

Supervisor: Dr. Liton Majumdar

PUBLICATION LIST

FIRST & SECOND AUTHOR REFEREED PAPERS

- ① Quantified Estimation of Molecular Detections across Different Classes of Neptunian Atmospheres Using Cross-Correlation Spectroscopy: Prospects for Future Extremely Large Telescopes with High-Resolution Spectrographs
The Astrophysical Journal Supplement Series, 278(1), 19 (2025)
Dubey, D., Majumdar, L., Beichman, C., Blake, G.A., Vasisht, G., & Henning, T.
- ② Polycyclic Aromatic Hydrocarbons as an Extraterrestrial Atmospheric Technosignature
The Planetary Science Journal, 6(1), 4 (2025)
Dubey, D., Kopparapu, R., Ercolano, B., & Molaverdikhani, K.
- ③ Comparative Simulation Study of Hot and Ultrahot Jupiter Atmospheres Using Different Ground-based High-resolution Spectrographs with Cross-correlation Spectroscopy
The Astrophysical Journal, 972(2), 165 (2024)
Dubey, D., & Majumdar, L.
- ④ Polycyclic aromatic hydrocarbons in exoplanet atmospheres - I. Thermochemical equilibrium models
Astronomy & Astrophysics, 678, A53 (2023)
Dubey, D., Grübel, F., Arenales-Lope, R., Molaverdikhani, K., Ercolano, B., Rab, C., & Trapp, O.

UNDER & REVIEW

- ① Probing the Atmospheres of Young Long-Period Sub-Neptune Progenitors with ELT/ANDES
in The Astronomical Journal
Dash, S*, **Dubey, D***, & Majumdar, L.
- ② Demographic Inference of Exoplanet Chemistry is Biased by Free-Chemistry Retrievals
in Nature Communications
Dubey, D., Molaverdikhani, K., Ercolano, B. Shivaprasad, S., Grübel, F., & Arenales-Lope, R.

OTHER REFEREED PAPERS

- ① Polycyclic aromatic hydrocarbons in exoplanet atmospheres: a detectability study
MNRAS, 536(2), 1555-1578 (2025)
Arenales-Lope, R., Molaverdikhani, K., **Dubey, D.**, Ercolano, B., Grübel, F., & Rab, C.
- ② Detectability of polycyclic aromatic hydrocarbons in the atmosphere of WASP-6 b with JWST NIRSpec PRISM
MNRAS, 536(1), 324-339 (2025)
Grübel, F., Molaverdikhani, K., Ercolano, B., Rab, C., Trapp, O., **Dubey, D.**, & Arenales-Lope, R.

- ③ Data availability and requirements relevant for the Ariel space mission and other exoplanet atmosphere applications
RAS Techniques and Instruments, 3(1), 636-690 (2024)
Chubb, K. L. et al. (including **Dubey, D.**)

FELLOWSHIPS & AWARDS

- 2021 **Gold Medalist in International Genetically Engineered Machine (iGEM) Competition for IISER Kolkata**
Role: Advisor of the math modeling team
Project: Tackling sub-clinical Bovine Mastitis in a Biotechnological way
iGEM Headquarters, United States
- 2019 **Summer Research Fellowship for a summer research project on Radio Astronomy**
Indian Academy of Sciences
- 2017 - 2022 **KVPY Fellowship (Registration No.: SX-1611033) for excellence in basic sciences**
Ministry of Education & Department of Science and Technology (DST), Govt. of India

SKILLS

Languages:

Python, Fortran (Basic), C (Basic)
MATLAB

Technical Skills:

Forward Modeling, Atmospheric Retrieval, High-resolution Spectroscopy, PAH Chemistry

Developed Code:

Calculates the shortest chemical pathway between a source and a sink molecule for VULCAN and ARGO

Softwares:

Equilibrium Chemistry Code: FastChem, GGChem
1D Forward Model: petitCODE
1D Radiative Transfer Model: petitRADTRANS, PSG, POSEIDON
1D Chemical Kinetics Model: VULCAN
Molecular Linelist to Opacity Generator: ExoCross
Cross-correlation Spectroscopy Code: SPECTR

ACADEMIC ROLES & MEMBERSHIPS

TEACHING & TUTORING

- Spring 2022 **PH3201: Basic Statistical Mechanics**
Instructor: Prof. Pradeep Kumar Mohanty
Department of Physical Sciences, IISER Kolkata
- Spring 2022 **CH4209: Advanced Quantum Chemistry**
Instructors: Prof. Sourav Pal and Dr. Mousumi Das
Department of Chemical Sciences, IISER Kolkata
- Autumn 2021 **PH1102: Physics Laboratory I**
Instructors: Dr. Ritesh Kumar Singh, Dr. Dhananjay Nandi and Dr. Rumi De
Department of Physical Sciences, IISER Kolkata
- Autumn 2020 **PH2103: Physics Laboratory III**
Instructors: Dr. Chiranjib Mitra, Dr. Nirmalya Ghosh, and Dr. Subhasis Sinha
Department of Physical Sciences, IISER Kolkata

ORGANIZATIONAL AFFILIATIONS

Dec 2023 - present

ARIEL Consortium Member

I am currently part of the following scientific working groups: Chemistry WG, Cloud & Haze WG

ARIEL Consortium Chemistry WG

I am currently an active member of the ARIEL Mission Chemistry White Paper writing group

ARIEL Consortium

I contributed to the ARIEL Data White Paper

Dec 2022 -
present

Twinkle Consortium Member

I am currently part of the Twinkle science team

CONFERENCE & SEMINARS

- 01 - 05 July, 2025 Contribution Talk at **BEACON Conference**
Reykjavik, Iceland
- 15 - 19 July, 2024 Poster presentation at **Two HoRSEs Conference**
Berlin, Germany
- 16 - 21 June, 2024 Poster presentation at **Exoplanets 5 Conference**
Leiden, Netherlands
- 05 - 10 May, 2024 Contribution talk at **Astrobiology Science Conference: AbSciCon**
Rhode Island, United States
- 23 - 26 Apr, 2024 Contribution talk at **ARIEL Consortium Meeting**
Tartu, Estonia
- 17 - 19 Aug, 2023 Contribution talk at **Strange New Worlds: The Exploration of Exoplanets**
IISER Pune, India
- 22 - 26 Mar, 2023 Poster presentation at **the 4th Advanced School on Exoplanetary Science**
Vietri sul Mare (Salerno), Italy
- 14 - 16 Mar, 2023 LOC of **All-hands-on-deck-Meeting**
Organized by: Exploring the Diversity of Extrasolar Planets (SPP 1992)
Ludwig-Maximilians-Universität München
- 21 - 25 Mar, 2022 LOC of **STATPHYS Kolkata XI conference**
Organized by: IISER Kolkata & SN Bose National Center for Basic Sciences

INVITED TALKS

- 22 Apr, 2025 Talk on **Snooping on Hot Jupiters: What Giant Telescopes can Reveal about Gas Giants**
University of Amsterdam
- 27 Feb, 2025 Talk on **Bridging Chemistry and Technology: The Dual Role of PAHs in Exoplanetary Atmospheres**
ARIEL Chemistry WG
- 28 Sep, 2024 Talk on **Delving into the chemistry of hot and ultra-hot Jupiters using High-resolution Spectroscopy: a future with E-ELT**
Department of Physical Sciences, IISER Kolkata, India
- 11 Oct, 2023 Talk on **Polycyclic Aromatic Hydrocarbons in Exoplanet Atmospheres (Thermochemical Equilibrium Models)**
CAS Journal Club, MPE, Garching, Germany
- 02 Oct, 2023 Talk on **PAH formation in exoplanet atmospheres**
European Southern Observatory (ESO), Garching, Germany
- 25 Aug, 2023 Talk on **PAH formation in exoplanet atmospheres: exploring chemistry**
School of Earth and Planetary Sciences, NISER, India

REFEREES

1. Prof. Barbara Ercolano

Professor, Fakultät für Physik, Universitäts-Sternwarte
Ludwig-Maximilians-Universität München
Scheinerstr. 1, D-81679 München, Germany
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3. Dr. Liton Majumdar

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School of Earth and Planetary Sciences
National Institute of Science Education and Research
Odisha, India - 752 050

Visiting Scientist, NASA Jet Propulsion Laboratory (JPL)
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2. Dr. Karan Molaverdikhani

Guest Scientist
Max-Planck-Institut für extraterrestrische Physik
Gießenbachstr. 1, D-85748 Garching, Germany
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