



Milan Sil

Curriculum Vitae

**Contact
Information**

Present Address:
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Permanent Address:
Vill. - Ichapur, P.O. - Kaikala,
P.S. - Haripal, Dist. - Hooghly,
West Bengal, 712405, India.

Websites

ORCID — Google Scholar — Research Gate — LinkedIn — Twitter

**Personal
Information**

Born: on January 4th 1993, at Haripal, Hooghly, West Bengal, India.
Nationality: Indian
Languages Known: English, Bengali, Hindi
Gender: Male (Gender identity is the same as assigned at birth)
Sexual Orientation: Heterosexual/Straight
Marital Status: Married
Religion or Belief: Hindu
Ethnic Origin: Asian — Indian
Disability: No.

Research Interests

- Molecular excitation and radiative transfer for astrochemistry applications
- Quantum chemical study
- Prebiotic chemistry
- Synthesis of Complex Organic Molecules (COMs) in star-forming regions
- Astrochemical modelling in radiation-dominated regions
- Astrochemical gas-grain modelling in star-forming regions

My research background is in theoretical and computational astrochemistry. My research focuses on modeling the molecular complexity in different astrophysical environments (specially high-radiation environments like supernova remnants filamentary region, PDR, HII region, diffuse ISM) using Cloudy spectral synthesis code. I also use gas-grain chemical modeling for star-forming environments. In addition, I do complementary various *ab initio* quantum chemical computations like binding energies of atomic/molecular species on icy dust surfaces, spectroscopic constants, infrared features, activation barrier for a reaction through transition state calculations, etc. (using Gaussian 09/16 computational chemistry program) necessary for modeling and spectroscopy purposes.

**Research
Employment**

- **Postdoctoral Researcher** June 2023 to Present
Institut de Planétologie et d'Astrophysique de Grenoble (IPAG)
Université Grenoble Alpes (UGA)
F-38000 Grenoble, France
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Institut de physique de Rennes (IPR)
Université de Rennes
UMR 6251, F-35000 Rennes, France
- **Post Doctoral Research Associate - I** May 2022 to May 2023
Department of Astrophysics and High Energy Physics
Satyendra Nath Bose National Centre for Basic Sciences
Block-JD, Sector-III, Salt Lake, Kolkata-700 106, India
- **Ph.D. Research Fellow** 2016-2021
University of Calcutta, Kolkata, India
Advisor: Dr. Ankan Das

**Educational /
Academic
Qualification**

- University of Calcutta**, Kolkata, India
- Ph.D. in Physics, June 23, 2022**
- Thesis title: **Physics and Chemistry of the Star Forming Region and Protoplanetary Disk**
 - Advisor: Dr. Ankan Das
- University of Calcutta**, Ramakrishna Mission Residential College, Narendrapur, Kolkata, India
- M.Sc., Physics, August 2015
- University of Calcutta**, Serampore College, Serampore, India
- B.Sc., Graduated with first class honours in Physics, May 2013

**Refereed Journal
Publications**

1. Adsorption energies of H and H₂: A Quantum Chemical Study, **Milan Sil**, Prasanta Gorai, Ankan Das, Dipen Sahu, & Sandip K. Chakrabarti, 2017, The European Physical Journal D, 71, 45.
2. Chemical Modeling for Predicting the Abundances of Certain Aldimines and Amines in Hot Cores, **Milan Sil**, Prasanta Gorai, Ankan Das, Bratati Bhat, & Sandip K. Chakrabarti, 2018, The Astrophysical Journal, 853, 139.
3. An Approach to Estimate the Binding Energy of Interstellar Species, Ankan Das, **Milan Sil**, Prasanta Gorai, Sandip K. Chakrabarti, & J. C. Loison, 2018, The Astrophysical Journal Supplement Series, 237, 9.
4. Identification of Pre-biotic Molecules Containing Peptide-like Bond in a Hot Molecular Core, G10.47+0.03, Prasanta Gorai, Bratati Bhat, **Milan Sil**, Suman K. Mondal, Rana Ghosh, Sandip K. Chakrabarti, & Ankan Das, 2020, The Astrophysical Journal, 895, 86.
5. Systematic Study on the Absorption Features of Interstellar Ices in the Presence of Impurities, Prasanta Gorai, **Milan Sil**, Ankan Das, Bhalamurugan Sivaraman, Sandip K. Chakrabarti, Sergio Ioppolo, Cristina Puzzarini, Zuzana Kanuchova, Anita Dawes, Marco Mendolicchio, Giordano Mancini, Vincenzo Barone, Naoki Nakatani, Takashi Shimonishi, & Nigel Mason, 2020, ACS Earth and Space Chemistry, 4, 920.
6. Exploring the Possibility of Identifying Hydride and Hydroxyl Cations of Noble Gas Species in the Crab Nebula Filament, Ankan Das, **Milan Sil**, Bratati Bhat, Prasanta Gorai, Sandip K. Chakrabarti, & Paola Caselli, 2020, The Astrophysical Journal, 902, 131.

7. Effect of binding energies on the encounter desorption, Ankan Das, **Milan Sil**, Rana Ghosh, Prasanta Gorai, Soutan Adak, Subhankar Samanta, & Sandip K. Chakrabarti, 2021, *Frontiers in Astronomy and Space Sciences*, 8, 78.
8. Chemical complexity of phosphorous bearing species in various regions of the interstellar medium, **Milan Sil**, Satyam Srivastav, Bratati Bhat, Suman Kumar Mondal, Prasanta Gorai, Rana Ghosh, Takashi Shimonishi, Sandip K. Chakrabarti, Bhalamurugan Sivaraman, Amit Pathak, Naoki Nakatani, Kenji Furuya, Ankan Das, 2021, *The Astronomical Journal*, 162, 119.
9. Is there any linkage between interstellar aldehyde and alcohol? Suman K. Mondal, Prasanta Gorai, **Milan Sil**, Rana Ghosh, Emmanuel E. Etim, Sandip K. Chakrabarti, Takashi Shimonishi, Naoki Nakatani, Kenji Furuya, Jonathan C. Tan, and Ankan Das, 2021, *The Astrophysical Journal*, 922, 194.
10. Phenol in high-mass star-forming regions, Rana Ghosh, **Milan Sil**, Suman K. Mondal, Prasanta Gorai, Dipen Sahu, Rahul Kumar Kushwah, Bhalamurugan Sivaraman, and Ankan Das, 2022, *Research in Astronomy and Astrophysics*, 22, 065021.
11. Astrochemical model to study the abundances of branched carbon-chain molecules in a hot molecular core with realistic binding energies, Satyam Srivastav, **Milan Sil**, Prasanta Gorai, Amit Pathak, Bhalamurugan Sivaraman, Ankan Das, 2022, *Monthly Notices of the Royal Astronomical Society*, 515, 3524.

Publication in Proceedings

1. Binding Energy and Isomerism: Two Important Aspects of Astrochemistry, **Milan Sil**, 2018, In: Mukhopadhyay B., Sasmal S. (eds) *Exploring the Universe: From Near Space to Extra-Galactic*. *Astrophysics and Space Science Proceedings*, vol 53. Springer, Cham.

Contributed oral presentations

- Astrochemistry in the THz domain, October 2017, Chennai, India
Title: "Systematic study on the presence of impurities on interstellar ices"
- 42nd COSPAR Scientific Assembly, July 2018, USA
Title: "Binding energy a key to defining interstellar volatile species"
Title: "A Systematic Study of Pre-biotic Aldimines and Amines in Hot Cores"
Title: "A Theoretical Prediction of Interstellar Bio-Molecule abundances"
- Exploring the Universe: Near Earth Space Science to Extra-Galactic Astronomy — S. N. Bose National Centre for Basic Sciences, Kolkata, India — 14 – 17 November 2018
Title: "A New Set of Binding Energies for Astrochemical Modeling"
- 43rd COSPAR Scientific Assembly (COSPAR-2021-Hybrid), 28 January - 4 February 2021, Sydney Australia.
Title: "Fate of identifying noble gas related species in the Crab nebula environment"
- Atomic Molecular and Optical Physics Division area seminar (online) — Physical Research Laboratory — Astrochemistry Early Career Researchers Webinar — 15 July 2021
Title: "Chemical composition in various evolutionary phases of the star-forming regions"
- Astrochemistry Discussions — Early-Career Day! — Wednesday 8 December 2021
Title: "Binding Energy: a Fundamental Parameter to Formulate Interstellar Chemistry"
- Evolved Stars and their Circumstellar Environments — 14 - 17 December 2021
Title: "Exploring Noble Gas Species in the Radiation-Dominated Region"

- 44th COSPAR Scientific Assembly, 16 - 24 July 2022, Athens, Greece.
Title: "Binding energy: a fundamental parameter to model interstellar chemistry"

Poster presentations

- International Conference on Infrared Astronomy and Astrophysical Dust, October 2019, IUCAA Pune, India
Title: "Complex Organic Molecules in the Star Forming Region"
- 43rd COSPAR Scientific Assembly (COSPAR-2021-Hybrid), 28 January - 4 February 2021, Sydney Australia.
Title: "Estimating realistic values of binding energy of species for astrochemical modeling"

Technical Skills

- Gaussian 09/16 suite of programs for computing chemical properties of species of astrochemical interest.
- Cloudy spectral synthesis code.
- RADEX radiative transfer code.
- Gas-grain chemical modeling.
- Fortran, Python, Shell, LATEX, Xmgrace, Gnuplot, Origin.
- Linux OS, Windows OS.

Awards / Fellowships / Professional Memberships

Travel Awards:

- DST-SERB International Travel Support (ITS) for participating in the 42nd COSPAR Scientific Assembly, Pasadena, California, United States 14 - 22 July 2018
- Partial travel support from the Committee on Space Research for participating in the 42nd COSPAR Scientific Assembly, Pasadena, California, United States 14 - 22 July 2018
- Partial travel support from the Committee on Space Research for participating in the 44th COSPAR Scientific Assembly, Athens, Greece 16 - 24 July 2022

Student Awards / Fellowships:

- DST-INSPIRE Scholarship during B.Sc. and M.Sc. 2011-2015
- Holding rank in CSIR National Eligibility Test (NET) for Lectureship (LS) June 2015
- Holding all India rank in GATE (Physics) 2015 and 2016
- DST-INSPIRE Fellowship during Ph.D. 2016-2021

Professional Membership:

- Member of International Astronomical Union (IAU)
- Honorary Associate of Institute of Astronomy Space and Earth Science (IASSES), Kolkata, India

Reference

Dr. Ankan Das

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