Curriculum Vitae of Dr. Sujay Pal

Present Status:

Assistant Professor (from December 2019)
Department of Physics
Srikrishna College, Bagula, Nadia, Affiliated to Kalyani University

Honorary Associate Professor, Indian Centre for Space Physics, Kolkata

Guest Faculty, Department of Atmospheric Sciences (M.Sc.),
University of Calcutta, Ballygunge, Kolkata 700109 (2020 -2024)

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DETAILS OF EDUCATION

Ph.D. in Physics from the University of Calcutta, worked at S N Bose National Centre for Basic Sciences, Kolkata (Thesis submitted on 8th May, 2013, Degree awarded on 2nd January, 2014)

Specialization: Space Physics

Supervisor: Prof. Sandip K. Chakrabarti, S N Bose National Centre for Basic Sciences, Kolkata

M. Sc. in Applied Physics, Indian Institute of Engineering Science and Technology (IIEST), 2008

Specialization: Material Physics, Physics of Semiconductor Devices

POST-DOCTORAL EXPOSURE/JOB EXPERIENCE

- **UGC-Dr. D. S. Kothari Fellow**
  Department of Atmospheric Sciences
  University of Calcutta, From Feb. 2018- December 2019

- **Assistant Professor in Physics**, March 2017 to February, 2018
  Department of Basic Science & Humanities
  Gargi Memorial Institute of Technology (GMIT), Baruipur, Kolkata 700144

- ***Post-doctoral Research Assistant-II,*** October 2015 to March 20, 2017
  Department of Ionospheric Sciences
  Indian Centre for Space Physics, Kolkata 700084

- ***Assistant Professor***
  Department of Communication Engineering & Informatics
  University of Electro-Communication,
  Chofu, Tokyo, Japan, 1st Aril, 2014 to –September 30, 2015.

- ***Project Scientist (MoES)***
  Department of Ionospheric Sciences
  Indian Centre for Space Physics, Kolkata-700084, from July, 2012 – March, 2014.

RESEARCH INTERESTS

- Space weather, Radio Remote Sensing
- AI/ML Application, Satellite observations
- Atmospheric & Space Electricity
- Total Lightning, Geohazards

AWARDS/HONORS/FELLOWSHIP

- The **SERB International Research (SIR)** Experience Fellowship, 2022
- The **SERB Start-up Research Grant** (SRG), 2020-2022
- The **UGC-Dr. D. S. Kothari** Post-doctoral Fellowship, 2018
- **Outstanding Paper Award** in the 3rd Regional Science and Technology Congress (Western Region), organized by the Department of Higher Education, Science and Technology and Biotechnology, Govt. of West Bengal, December 20-21, 2018.
- The **URSI (International Union of Radio Science) Young Scientist Award**, AT-RASC, 2015, Gran Canaria, Spain.
- The **University Medal** on 16th February, 2009 for securing 1st class 1st position in M.Sc. examination 2008 in Applied Physics by Bengal Engineering & Science University
- ***Junior Research Fellow***, 1st August 2008 – 30th July 2010, S. N. Bose National Centre for Basic Sciences, Kolkata
- ***Senior Research Fellow***, 1st August 2010 – 30th June 2012, S. N. Bose National Centre for Basic Sciences, Kolkata

OTHER QUALIFICATIONS

- **Post M. Sc. Graduate Course**, 2008 - 2009, S N Bose National Centre for Basic Sciences; Subjects: Advanced Quantum Mechanics, Statistical Mechanics and Projects.
- **Ph.D. Course Work**, 2010 - 2011 according to the University Grant Commission (UGC) rule; Subjects: Review work & Research Methodology, Astrophysics & Project.
- National Eligibility Test (NET) in Physical Sciences with **CSIR-JRF**, June 21, 2009 (All India Rank 135).
- Graduate Aptitude Test in Engineering (**GATE**) in Physical Sciences, February 10, 2008 (All India Rank 378).
- Joint Entrance Screening Test (**JEST**) in Physical Sciences, February 18, 2007 (All India Rank 194).

Journal Reviewer

Journal of Geophysical Research-Space Physics (JGR-Space), Advances in Space Research (ASR), Journal of Atmospheric and Solar-Terrestrial Physics (JASTP), Radio Science, Geophysical Research Letter (GRL), ANGEO, GSRL, Geoscience Frontiers

Membership of Professional bodies:

1) **Individual Membership (MURSI)** of International Union of Radio Science (**URSI**), MURSI No. M1810285331, Ghent, Belgium.
2) Life Member of **Indian Radio Science Society (InRaSS)**, New Delhi, India, 2019-

3) Regular Membership of the European Geosciences Union **(EGU)**, Munich, Germany, 2019-
4) Regular Membership of the American Geophysical Union **(AGU)**, Washington, D.C., United States, 2020-
5) Life Member (L2306) of Astronomical Society of India **(ASI)**, Hyderabad
6) Life Member of the Indian Association of Physics Teachers **(IAPT)**, Kanpur, India
7) Life Member of Indian Centre for Space Physics **(ICSP)**, Kolkata
8) Associate of **COSPAR** (Committee on Space Research), Paris, France.
9) Member of the European Space Weather and Space Climate Association (E-SWAN), 2023
10) Member of International Space Weather Action Teams (ISWAT, G2B-11)

Academic Visit for Research Collaboration:

1) Visit to University of Electro-Communication, Tokyo, Japan during Aug-Oct. 2022 for collaborative works on machine learning application to atmospheric electricity.
2) Visit to **University of Electro-Communication, Tokyo, Japan** from **23rd June, 2018 to 7th July, 2018** to work with Prof. Y. Hobara on atmospheric electricity and radio remote sensing projects.
3) Department of Physics, Cooch Behar Panchanan Barma University, West Bengal, September, 2019 to work with Prof. P. K. Haldar.

OTHER RESEARCH GRANT THROUGH FELLOWSHIP AND TRAVEL GRANT

- Received **SERB Travel Grant** to Attend the ESWW-2023 conference in Toulouse, France, Nov. 2023.
- Received the **Roland-Schlich Travel Award for Early Career Scientist** from the European Geosciences Union (EGU) for the EGU 2019 General Assembly, Vienna, Austria.
- Received **the CSIR** travel grant for attending the **European Geosciences Union (EGU) General Meeting 2019**, held at Vienna, Austria from April 7 –April 12, 2019.
- **DST-SERB Travel Award** for **Young Scientist** to attend the **The Polar Upper Atmosphere: from Science to Operational Issues**", held in L'Aquila, Italy, September 1721, 2018, organized by the International Scholl of Space Science (ISSS), Italy and also a partial travel support in terms of reduced registration fee from **the School Organizing Committee.**
- Selected for the Young Scientist Travel Grant for the **ESPAS (near earth space data infrastructure for e-science) Training School in Warsaw, Poland**, October- 2015 (not attended due to visa problem).
- Travel support by the University of Electro-Communication for the **1st USRI Atlantic Radio Science Conference (AT-RASC 2015**), Gran Canaria, Spain.
- Full travel support to participate in the **XXXI URSI General Assembly of the International Union of Radio Science, Beijing, 2014**, by the University of Electro-Communication, Japan.
- Student Travel Grant Recipient from the Committee on Space Research (COSPAR) to participate in the **39th COSPAR Assembly 2012, Mysore, India**

PH.D Supervision:

1. Kheyali Barman (Joint supervisor, Thesis submitted to CBPBU)
2. Rakhijul Alam Faruque (Joint supervisor, registered to NSOU)
3. Jitiprova Ghosh (Joint supervisor, registered to NSOU)
4. Amrita Ghosh (Joint supervisor, admitted to CBPBU)

M.Sc. Project supervised: 13, Summer Internship: 3

1. Ushasi Bandyopadhyay, Fair Weather Atmospheric Electric Field Variation Over Two Tropical Locations in West Bengal and Possible Correlation with Air Quality Index, Dept. of Atmospheric Sciences, University of Calcutta (2024)

2. Arnatri Guha, Ionospheric Disturbances Associated with Impulsive Lightning Activities over the Indian Sub-Continent using VLF signals, Dept. of Atmospheric Sciences, University of Calcutta (2024)

3. Kuntal Paul, Correlation between Lightning and Weather parameters and Prediction of Lightning Rate using Artificial Neural Network Associated with Thunderstorms over Kolkata, Dept. of Atmospheric Sciences, University of Calcutta (2023)

4. Tiasha Purkait, Finding a Correlation between lightning density and radar reflectivity for thunderstorms over West Bengal, Dept. of Atmospheric Sciences, University of Calcutta (2023)

5. Abhradip Bhuniya, Temperature disturbances in the stratosphere during cyclonic storms over the Bay of Bengal, Dept. of Atmospheric Sciences, University of Calcutta (2021-22)

6. Biplab Sana, Machine Learning approach for the prediction of lightning /thunderstorm over Gangetic West Bengal using meteorological data, Dept. of Atmospheric Sciences, University of Calcutta (2021-22)

7. Paramita Pal, Spatio-temporal analysis of cloud-to-ground and total lightning activities over West Bengal, Dept. of Atmospheric Sciences, University of Calcutta (2021-22)

8. Debrupa Mondal, Total Lightning Behavior of Severe and Moderate Summer Thunderstorms of 2018 & 2019 Around Kolkata, University of Calcutta (2020)

9. Shouvik Mandal, Study of thunderstorm induced disturbances in the lower ionosphere using very low frequency remote sensing method, University of Calcutta (2020)

10. Bikash Dolai, Dept. of Physics, Contai P. K. College at ICSP (2014)

11. Pranay Bera, Dept. of Physics, Contai P. K. College at ICSP (2014)

12. Suman Chakrbarty, Narendrapur RKMRC, Kolkata at ICSP (2013)

13. Partha Panja, Narendrapur RKMRC, Kolkata at ICSP (2013)

Seminar/Conferences/Scientific Meeting Organized:

1) Joint Convenor of the scientific session **EFGH4- URSI AP-RASC-2025, Sydney, Australia**

2) Organized a National "**Workshop on Weather and Climate: Data Analysis and Application**" jointly with Department of Atmospheric Sciences (DAS), University of Calcutta, Kolkata, February 17-18, 2020, Sponsored by Srikrishna College & DAS, CU.

3) Worked as a **Joint Convenor** of the scientific session **EFGH4 entitled "EM Noise and Radio Remote Sensing Applications in Terrestrial and Planetary Environment" in the URSI Asia Pacific Radio Science Conference, (APRASC-2019)** New Delhi.

4) Member of Organizing Committee (Secretary) for the 1st **National Conference on Severe Weather (NCSW-2019)**, 17-19 March, 2019 organized by the Department of Atmospheric Sciences, University of Calcutta.

5) Member of Local Organizing Committee in 1st International Conference on Very Low Frequency (VLF) Radio Waves: Theory & Observations (**VELFRATO-10**), 13th to 18th March, 2010, S. N. Bose National Centre for Basic Sciences, Kolkata, India.

Highlight of research works:

1) Radio waves reveal birth of gravity waves during solar eclipse, natureindia, doi:10.1038/nindia.2015.28, published online 26 February 2015.
2) Measuring the effect of Sudden Stratospheric Warming on radio signals, Editor's highlight, Journal of Geophysical Research- Space Physics, July 2017, http://agupubs.onlinelibrary.wiley.com/hub/article/10.1002/2016JA023813/editor-highlight

PROJECT ONGOING/COMPLETED:

1) Principal Investigator of the Project No. SRG/2020/001104 funded by the SERB under the Scheme of Start-up Research Grant for Young Scientist, Title: Monitoring of transient luminous events associated with lightning/thunderstorms as well as their effects on the upper atmosphere using optical cameras and radio receivers, Duration- 2 years, 2020-2022, Cost: 6,71,928/-.

2) Principal Investigator of SERB International Research Experience (SIRE) project, Developing a model for early warning of lightning and severe weather hazards: A machine learning approach, 2022, Duration: 3 months, Cost: 7,02,319/-.

3) Co-Principal Investigator of the Project No. 0258/RND/ESGI/CU16/Mar-2021/1/1 funded by WBDSTBT, 2021-23, Cost: Rs., 3,80,000/- Duration- 3 years.

LIST OF PUBLICATIONS

Book:

1. Advances in Modern and Applied Sciences, Nov. 2022, Published by Scientific Research Publishing, Inc. ISBN: 978-1-64997-437-2, 268 pages, S. Pal & T. K. Biswas (Editors)
https://www.scirp.org/book/detailedinforofabook.aspx?bookid=2907

IN PEER-REVIEWED JOURNAL ('*' indicates corresponding author)

31) J. Ghosh, R.A. Faruque, G. Amin, S. Pal, Detection of Ionospheric and Atmospheric Precursors associated with the March 2025 Myanmar Earthquake (M=7.7): A Multi-Parameter Study (submitted).

30) J. Ghosh, R.A. Faruque, G. Amin, S. Pal, Mid- and high-latitude ionospheric responses to the Mother's Day super geomagnetic storm of 2024 using VLF propagation and satellite data, JGR, (submitted).

29) R. A. Faruque, S. Pal*, G. Amin, S. K. Mondal, Y. Hobara, Investigating the Effects of the Super Geomagnetic Storm of May 2024 on the DC and AC Global Electric Circuit (submitted)

28) A. Sen, B. Das, **S. Pal***, S.K. Mondal, D- and F-Region Ionospheric Response to the Severe Geomagnetic Storm of April 2023, 2025, Atmosphere 2025, 16(6), 716 https://doi.org/10.3390/atmos16060716

27) R. A. Faruque, **S. Pal***, G. Amin, S.K. Mondal, 2025, Atmospheric Electric Field Variations and its Correlation with Air Quality Index as Observed from Two Low-Latitude Indian Stations, JASTP, Volume 271, 106505, https://doi.org/10.1016/j.jastp.2025.106505

26) K. Barman, B. Das, **S. Pal***, P. K. Haldar, 2025, Low-latitude sub-ionospheric VLF radio signal disturbances due to solar flares: Effects on the signal attenuation and waveguide modes, Journal of Atmosphere and Solar-terrestrial Physics, https://doi.org/10.1016/j.jastp.2025.106433

25) K. Barman, B. Das, **S. Pal***, P. K. Haldar, S. K. Midya, S. Pal, S. K. Mondal, D-region ionospheric disturbances due to the December 2019 solar eclipse observed using multi-station VLF radio network, Volume 74, Issue 3, 1 August 2024, Pages 1460-1470, https://doi.org/10.1016/j.asr.2024.04.049

24) A. Sen, **S. Pal**, S. K. Mondal, Mid-latitude ionospheric disturbances during the major Sudden Stratospheric Warming event of 2018 observed by sub-ionospheric VLF/LF signals, Advances in Space Research, Volume 73, Issue 1, 1 January 2024, Pages 767-779, https://doi.org/10.1016/j.asr.2023.10.025

23) T. Basak, Y. Hobara, **S. Pal**, T. Nakamura, J. Izutsu, T. Minatohara, Modeling of Solar Eclipse effects on the sub-ionospheric VLF/LF signals observed by multiple stations over Japan, Advances in Space Research, Volume 73, Issue 1, 1 January 2024, Pages 736-746, https://doi.org/10.1016/j.asr.2023.09.063

22) **Pal, S.**; Hobara, Y.; Shvets, A.; Schnoor, P.W.; Hayakawa, M.; Koloskov, O. First Detection of Global Ionospheric Disturbances Associated with the Most Powerful Gamma Ray Burst GRB221009A. Atmosphere 2023, 14, 217. https://doi.org/10.3390/atmos14020217.

21) B, Das., K, Barman., **S, Pal***., & P. K, .H. (2022). Impact of three solar eclipses of 2019-2020 on the D-region ionosphere observed from a sub-tropical low-latitude VLF radio station. Journal of Geophysical Research: Space Physics, 127, e2022JA030353. https://doi.org/10.1029/2022JA030353

20) K. Giri, S. Pal*, T.K. Biswas, S.K. Midya, 2020, Simulation of Diurnal Variation of Sub-Ionospheric VLF Transmitter Signals Using Machine Learning Approach, 2021, Romanian Journal of Physics (European Physics Society), 66, 807, https://rjp.nipne.ro/2021_66_3-4/RomJPhys.66.807.pdf

19) B. Das, A. Sen, PK Haldar, S. Pal*, 2021, Response of the Sub-Ionospheric VLF Signals to the Super Cyclonic Storm Amphan: First observation from Indian Subcontinent (**Short Communication**), Journal of Atmospheric and Solar-Terrestrial Physics (Elsevier), doi:10.1016/j.jastp.2021.105668.

18) S. K. Mondal, S. Pal, A. Sen, M. Rahaman, S. K. Midya, 2021, Long-lasting disturbances in the mid-latitude sub-ionospheric VLF radio signal during the super geomagnetic storm of 17th March 2015, Advances in Space Research, (Elsevier), https://doi.org/10.1016/j.asr.2021.04.044.

17) B. Das, A. Sen, P.K. Haldar, **S Pal**, 2020, VLF radio signal anomaly associated with geomagnetic storm followed by an earthquake at a subtropical low latitude station in North Eastern part of India, Indian Journal of Physics, Published 2021, https://doi.org/10.1007/s12648-020-01966-2.

16) B. Das, S. Sarkar, P.K. Haldar, **S Pal*,** 2020, D-region ionospheric disturbances associated with the Extremely Severe Cyclone Fani over North Indian Ocean as observed from two tropical VLF stations, https://doi.org/10.1016/j.asr.2020.09.018.

15) **S Pal***, S. Sarkar, S. K. Midya, S. K. Mondal, Y. Hobara, Low-Latitude VLF Radio Signal Disturbances Due to the Extremely Severe Cyclone Fani of May 2019 and Associated Mesospheric Response, Journal of Geophysical Research: Space Physics, 125, e2019JA027288. https://doi.org/10.1029/2019JA027288

14) SK Midya, **S. Pal***, R. Dutta et al., 2019, A preliminary study on pre-monsoon summer thunderstorms using ground-based total lightning data over Gangetic West Bengal, Indian Journal of Physics, https://doi.org/10.1007/s12648-020-01681-y

13) **Pal S.*,** Hobara Y., Chakrabarti S.K., and Schnoor P. W., Effects of the major Sudden Stratospheric Warming event of 2009 on the sub-ionospheric Very Low Frequency/Low Frequency radio signals, **June 2017**, Vol-122, Issue-7, 7555-7566, J. Geophys. Res. Space Physics, 122, doi:10.1002/2016JA023813, Impact Factor: 3.462 (**Highlighted in the Journal, Editor's Highlight**).

12) S. K Maji, S. K Chakrabarti, D. Sanki and **S. Pal***, Topside ionospheric effects of the annular solar eclipse of 15th January 2010 as observed by DEMETER satellite, Journal of Atmospheric and Solar-Terrestrial Physics, **April 2017**, Vol-159, pp-1-6, ISSN: 1364-6826, Impact Factor: 1.506.

11) **S. Pal*** and Y. Hobara, Mid-latitude atmosphere and ionosphere connection as revealed by very low frequency signals, Journal of Atmospheric and Solar-Terrestrial Physics, **February 2016**, Vol-138-139, pp-227-232, ISSN: 1364-6826, Impact Factor: 1.506.

10) K. Tatsuta, Y. Hobara, **S. Pal** and M. Balikhin, VLF sub-ionospheric anomaly due to geomagnetic storms: a statistical study, **November 2015**, Annales Geophysicae., Vol-33, 1457–1467, ISSN: 0992-7689, Impact Factor: 1.741.

9) Palit S., Basak T., **Pal S**., Chakrabarti S. K., Theoretical study of lower ionospheric response to solar flares: sluggishness of D-region and peak time delay, Astrophysics Space Science, **March 2015**, Vol. 356-1, 19-28, ISSN: 0004-640X, Impact Factor: 1.678.

8) **S. Pal***, S. Chakraborty, S. K. Chakraborti, On the use of Very Low Frequency transmitter data for remote sensing of atmospheric gravity and planetary waves, **February 2015**, Advances in Space Research, Vol. 55-4, 1190-1198, ISSN: 0273-1177, Impact Factor: 1.41.

7) S. Sasmal, **S. Pal** and S. K. Chakrabarti, Study of long path VLF signal propagation characteristics as observed from Indian Antarctic station, Maitri, Advances in Space Research, **October 2014**, Vol. 54-8, 1619-1628, ISSN: 0273-1177, Impact Factor: 1.41.

6) Palit S., Basak T., Mondal S. K., **Pal S**. and Chakrabarti S. K., Modeling of the Very Low Frequency (VLF) radio wave signal profile due to solar flares using the GEANT4 Monte Carlo simulation coupled with ionospheric chemistry, **September 2013**, Atmospheric Chemistry and Physics, Vol. 13, 9159–9168, ISSN: 1680-7316, Impact Factor: 5.626.

5**) S. Pal***, S. K. Maji and S. K. Chakrabarti, First Ever VLF Monitoring of Lunar Occultation of a Solar Flare during the 2010 Annular Solar Eclipse and its effects on the D-region Electron Density Profile, **December 2012**, Planetary and Space Science, Vol. 73, 310-317, ISSN: 0032-0633,Impact Factor: 1.941.

4) S. K. Chakrabarti, **S. Pal**, S. Sasmal et al., VLF campaign during the total eclipse of 22nd July, 2009: Observations and interpretations, **September 2012**, Journal of Atmospheric and Solar-Terrestrial Physics, Vol. 86, 65-70, ISSN: 1364-6826, Impact Factor: 1.506.

3) **S. Pal***, S. K. Chakrabarti and S. K. Mondal, Modeling of sub-ionospheric VLF signal perturbations associated with total solar eclipse 2009, in Indian subcontinent, **July 2012**, Advances in Space Research, Vol. 50, 196–204, ISSN: 0273-1177, Impact Factor: 1.41.

2) S. K. Chakrabarti, S. K. Mondal, S. Sasmal, **S. Pal** et al., VLF signals in summer and winter in the Indian sub-continent using multi-station campaigns, **May 2012**, Indian Journal of Physics, Vol. 86-5, 323–334, ISSN: 0973-1458, Impact Factor: 1.6.

1) **S. Pal***, T. Basak and S. K. Chakrabarti, Results of computing amplitude and phase of the VLF waves using wave-hop theory, Advances in Geosciences, **2011**, Solar Terrestrial (ST), Vol. 27, 1-11, World Scientific Publishing Company, ISBN-10 981-4355-40-2.

<u>In Peer-reviewed International Proceedings as full papers/ Book Chapters</u>: 23

23) A. Sen, S. K. Mondal, S. Pal, Effects of Sudden Stratospheric Warming (SSW) on the Upper Atmosphere, Advances in Modern and Applied Sciences, Scientific Research Publishing, Inc.ISBN: 978-1-64997-437-2, 179-186, https://www.scirp.org/book/detailedinforofabook.aspx?bookid=2907 (Book Chapter)

22) K. Barman, B. Das, P. K. Haldar, S. Pal, Ionospheric Effects of Cyclonic Storms: A Brief Review, 2022, Advances in Modern and Applied Sciences, Scientific Research Publishing, Inc. ISBN: 978-1-64997-437-2, 164-170, https://www.scirp.org/book/detailedinforofabook.aspx?bookid=2907 (Book Chapter)

21) B. Das, S. Pal and P. K. Haldar, "VLF radio signal perturbations during two recent solar eclipses observed from a VLF receiving station, Cooch Behar, India," 2021 XXXIVth General Assembly and Scientific Symposium of the International Union of Radio Science (URSI GASS), 2021, pp. 1-4, doi: 10.23919/URSIGASS51995.2021.9560244.

20) K. Barman, B. das, S. Pal, PK Haldar, Effects of tropical cyclones on the VLF atmospherics observed from low latitude receiving stations, 2021 XXXIVth General Assembly and Scientific Symposium of the International Union of Radio Science (URSI GASS), 2021, pp. 1-4, doi: 10.23919/URSIGASS51995.2021.9560207.

19) **S. Pal** and S. K Midya, A study of total lightning characteristics of thunderstorms over Gangetic West Bengal, URSI AP-RASC, 2019, Publisher: IEEE.

18) T. Basak, Y Hobara and **S. Pal**, Modeling of VLF network observations due to lower ionospheric perturbation during a solar eclipse, URSI AP-RASC, 2019, Publisher: IEEE.

17) **S. Pal**, "Remote sensing of the Ignorosphere: Need for a complete earth-ionosphere radio wave propagation model", 2018, Exploring the Universe: From near space to extra-galactic, Astrophysics and Space Science Proceedings, Springer International Publishing AG.

16) **S. Pal**, Y. Hobara, S. K. Chakrabarti, and P. W. Schnoor, Response of the sub-ionospheric VLF/LF signals to the major SSW event of 2009, URSI GASS, 2017, DOI: 10.23919/URSIGASS.2017.8105404, Publisher: IEEE.

15) **Sujay Pal**, Suman Chakraborty, and Sandip K. Chakrabarti, Remote Sensing of Atmospheric Gravity Waves (GWs) and Planetary Wave Type Oscillations (PWTOs) in the upper mesosphere-lower ionosphere system using the Very Low Frequency transmitter data, October 2014, Published in: General Assembly and Scientific Symposium (URSI GASS), DOI: 10.1109/URSIGASS.2014.6929556, Publisher: IEEE, Print ISBN: 978-1-4673-5225-3.

14) **Sujay Pal**, Surya K. Maji, and Sandip K. Chakrabarti, Low latitude sub-ionospheric VLF signal behaviour during the two recent solar eclipses: observation and simulation, October 2014, Published in: General Assembly and Scientific Symposium (URSI GASS), DOI: 10.1109/URSIGASS.2014.6929557, Publisher: IEEE, Print ISBN: 978-1-4673-5225-3.

13) Suman Chakraborty, **Sujay Pal**, and Sandip K. Chakrabarti, Characteristics of lightning associated transient perturbations in low latitude VLF paths, October 2014, Published in: General Assembly and Scientific Symposium (URSI GASS), DOI: 10.1109/URSIGASS.2014.6929559, Publisher: IEEE, Print ISBN: 978-1-4673-5225-3.

12) Tamal Basak, Sandip K. Chakrabarti, S. Sasmal, and **S. Pal**, Study of low-latitude ionospheric D-region negative ion profile during an M-class solar flare using VLF propagation effects, October 2014, Published in: General Assembly and Scientific Symposium (URSI GASS), DOI: 10.1109/URSIGASS.2014.6929789, Publisher: IEEE, Print ISBN: 978-1-4673-5225-3.

11) Palit, Sourav; Basak, Tamal; Pal, Sujay; Mondal, Sushanta K.; Chakrabarti, Sandip K., Effect of solar flares on ionospheric VLF radio wave propagation, modeling with GEANT4 and LWPC and determination of effective reflection height, October 2014, General Assembly and Scientific Symposium (URSI GASS), DOI: 10.1109/URSIGASS.2014.6929558, Publisher: IEEE, Print ISBN: 978-1-4673-5225-3.

10) **S. Pal**, T. Basak, S. K. Chakrabarti, Modeling VLF signal amplitudes over Indian sub-continent during the total solar eclipse, October 2011, General Assembly and Scientific Symposium XXXth URSI, DOI: 10.1109/URSIGASS.2011.6051008, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

9) **S. Pal** and S. K. Chakrabarti, Computation of amplitude and phase of VLF radio waves: Results from comparative study between wave-hop and waveguide mode theory, October 2011, General Assembly and Scientific Symposium, XXXth URSI, DOI: 10.1109/URSIGASS.2011.6051014, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

8) T. Basak, **S. Pal**, S. K. Chakrabarti, VLF study of Ionospheric properties during solar flares of varied intensity for a fixed propagation path, October 2011, General Assembly and Scientific Symposium, XXXth URSI, DOI: 10.1109/URSIGASS.2011.6051004, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

7) Chakrabarti, S.K., **Pal, S**., Sasmal, S., Mondal, S.K., Ray, S., Basak, T., Maji, S., VLF observational results of total eclipse of 22nd Jul , 2009 by ICSP team, October 2011, General Assembly and Scientific Symposium, XXXth URSI, DOI:10.1109/URSIGASS.2011.6051005, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

6) Sasmal, S.; Chakrabarti, S.K.; **Pal, S**.; Basak, T., A comparative study of VLF signals from several transmitters around the world as observed from Maitri station, Antarctica, October 2011, General Assembly and Scientific Symposium XXXth URSI, DOI: 10.1109/URSIGASS.2011.6051002, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

5) Chakrabarti, S.K., **Pal, S.**, Sasmal, S., Mondal, S.K., Ray, S., Basak, T., Results of VLF campaigns in Summer and Winter in Indian subcontinent, October 2011, General Assembly and Scientific Symposium XXXth URSI, DOI: 10.1109/URSIGASS.2011.6051007, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

4) Basak, T., Chakrabarti, S.K., **Pal, S.**, Computation of the effects of solar phenomena on Global Ionospheric Weather using waveguide mode theory of VLF propagation, October 2011, General Assembly and Scientific Symposium XXXth URSI, DOI: 10.1109/URSIGASS.2011.6051009, Publisher: IEEE, Print ISBN: 978-1-4244-5117-3.

3) **Sujay Pal** and S. K. Chakrabarti, Theoretical models for computing VLF wave amplitude and phase and their applications, October 2010, AIP (American Institute of Physics) Conference Proceedings, Vol-1286, 42-60, ISBN: 978-0-7354-0841-8.

2) S.K. Chakrabarti, S. Sasmal, **S. Pal** and S.K. Mondal, Results of VLF campaigns in Summer, Winter and during Solar Eclipse in Indian Subcontinent and beyond, October 2010, AIP (American Institute of Physics) Conference Proceedings, Vol-1286, 61-76, ISBN: 978-0-7354-0841-8.

1) T. Basak, S. K. Chakrabarti and **S. Pal**, Global effects on ionospheric weather over the Indian subcontinent at sunrise and sunset, October 2010, AIP (American Institute of Physics) Conference Proceedings, Vol-1286, 137-149, ISBN: 978-0-7354-0841-8.

Seminar/Conference/Symposium Presentation

Invited Talks:

1) Machine Learning Applications in Space Physics, Half-day workshop on Machine Learning and its applications, 7th September, 2024 at Indian centre for Space Physics, Kolkata.

2) Near-Earth Space Research through Radio Window, K.N. College on 23rd August, 2024 (online)

3) VLF/LF Remote Sensing of the near-Earth Space Environment, Cooch Behar Panchanan Barma University, 13th March 2023.

4) Delivered an invited talk entitled “Mid-latitude D-region ionospheric disturbances during some of the major SSW events in the northern polar region observed through low frequency radio signals” at the 50th **Anniversary International Symposium of Centre for Space Science and Radio Engineering (SSRE) of the University of Electro-Communication**, **Tokyo, Japan** during 25-26 June, 2018.

Contributed Talks/Posters:

26) Observation and modeling of D-region ionospheric disturbances due to solar eclipses using VLF/LF network at the 19th European Space Weather Week (ESWW 2023) November 20, 2023; Toulouse, France (Oral presentation).

25) Observation of D-region Ionospheric Disturbances due to Solar Eclipses Using the Ground-Based VLF Radio Network, Commission E: Electromagnetic environment and interference, 2022 URSI-Japan Radio Science Meeting (URSI-JRSM 2022), September 1-2, 2022, Chuo University, Tokyo, Japan (Oral Presentation).

24) Presented a paper titled "Effects of thunderstorms on the lower ionosphere as observed by VLF radio signals" in the AGU (American Geophysical Union) Fall Meeting 2020, 1-17 December 2020 (online).

23) 21st National Space Science Symposium (NSSS), 2022, IISER Kolkata, Network observations of D-region ionospheric disturbances during the two recent solar eclipses (Poster presentation).

22) Participated in the 4th Regional Science & Technology Congress (Southern Region), West Bengal on 23-24 Decmber, 2019 and presented a paper titled "Response of the Mesosphere and Lower Ionosphere during the Extremely Severe Cyclone Fani of May 2019: New Results from the Low Latitude station in Kolkata". (Poster)

21) Participated in the Young Scientist Conference as a part of "India International Science Festival-2019", Kolkata, November 5-8, 2019 and presented a paper on the theme Frontier Areas of Research. (Poster)

20) High latitude and mid-latitude ionospheric disturbances associated with some major stratospheric warming events in the Northern hemisphere, EGU General Assembly 2019, Vienna, Austria, 7-12 April, 2019. (Oral)

19) A study of total lightning characteristics of thunderstorms over Gangetic West Bengal, URSI-APRASC, New Delhi, 09-15 March, 2019. (Oral)

18) Total lightning activity during Nor'wester events over Gangetic West Bengal, 3rd Regional Science and Technology Congress (Western Region), Sidho Kanho Birsa University organized by the Department of Higher Education, Science and Technology and Biotechnology, Govt. of West Bengal December 20-21, 2018. (Oral)

17) **Sujay Pal,** Y. Hobara, S K Chakrabarti and P W Schnoor, Sub-ionospheric VLF/LF signal disturbances associated with the major sudden stratospheric warming event of 2009, Atmospheric electricity phenomena and Natural Hazards, University of Calcutta on 5th May, 2017 (Oral presentation).

16) **Sujay Pal** and Yasuhide Hobara, Atmosphere and ionosphere connection as revealed by the network observation of Very Low Frequency radio signals, The **URSI-Japan Radio Science Meeting** (**URSI-JRSM 2015**), September 3-4, 2015, Tokyo Institute of Technology, Japan (Poster presentation).

15) **Sujay Pal** and Yasuhide Hobara, Relationship between nighttime VLF amplitude and total column Ozone data: Possiblity of monitoring atmospheric Ozone from VLF remote sensing, **1st URSI Atlantic Radio Science Conference (AT-RASC 2015)**, May 18-22, 2015, Gran Canaria, Spain (Oral presentation).

14) **Sujay Pal**, Suman Chakraborty, and Sandip K. Chakrabarti, Remote Sensing of Atmospheric Gravity Waves (GWs) and Planetary Wave Type Oscillations (PWTOs) in the upper mesosphere-lower ionosphere system using the Very Low Frequency transmitter data, **31st URSI General Assembly and Scientific Symposium**, 16-23 August, 2014, Beijing, China (Poster presentation).

13) **Sujay Pal**, Surya K. Maji, and Sandip K. Chakrabarti, Low latitude sub-ionospheric VLF signal behaviour during the two recent solar eclipses: observation and simulation, **31st URSI General Assembly and Scientific Symposium**, 16-23 August, 2014, Beijing, China (Poster presentation).

12) Suman Chakraborty, **Sujay Pal**, and Sandip K. Chakrabarti, Characteristics of lightning associated transient perturbations in low latitude VLF paths, **31st URSI General Assembly and Scientific Symposium**, 16-23 August, 2014, Beijing, China (Poster presentation).

11**) Sujay Pal**, Yasuhide Hobara, Possible relation between the night time VLF amplitude and total Ozone variation, **91st workshop of Japan Society of atmospheric electricit**y, Gunma University, Japan, July 11-12, 2014 (Oral presentation).

10) **Sujay Pal**, S. K. Chakrabarti and S. K. Mondal, Modeling of sub-ionospheric VLF signal perturbations associated with total solar eclipse 2009 in Indian subcontinent, **39th COSPAR Scientific Assembly (Session C0.4)** in Mysore, India during 14 - 22 July 2012 (Oral presentation).

9) **Sujay Pal**, Surya K. Maji and Sandip K. Chakrabarti, First Ever VLF Monitoring of Lunar Occultation of a Solar Flare during the 2010 Annular Solar Eclipse and its effects on the D-region Electron Density Profile, **39th COSPAR Scientific Assembly (Session C1.1)** in Mysore, India during 14 - 22 July 2012 (Poster presentation).

8) **Sujay Pal** and Sandip K. Chakrabarti, Multi-satellite observation of Lunar Occultation of X-ray emission from a Solar Flare during the 2010 Annular Solar Eclipse, **39th COSPAR Scientific Assembly (Session E2.6)** in Mysore, India during 14-22 July 2012 (Poster presentation).

7) **Sujay Pal**, S. K. Chakrabarti and S. K. Mondal, Modeling of Sub-ionospheric VLF Signal Perturbations associated with Total Solar Eclipse-2009 in India, **Indo-US Workshop on Advancing VLF Science through the Global AWESOME Network**, in Goa, India during 28 Nov-01 Dec, 2011 (Poster presentation).

6) **Sujay Pal**, Tamal Basak and Sandip K. Chakrabarti, Modeling VLF signal amplitudes over Indian sub-continent during the total solar eclipse, **XXX URSI General Assembly and Scientific Symposium of International Union of Radio Science**, 13-20 August, 2011, Istanbul Lutfi Kirdar Covention and Exhibition Centre, Istanbul, Turkey (Poster presentation).

5) **Sujay Pal** and Sandip K. Chakrabarti, Computation of amplitude and phase of VLF radio waves: Results from comparative study between wave-hop and waveguide mode theory, **XXX URSI General Assembly and Scientific Symposium of International Union of Radio Science**, 13-20 August, 2011, Istanbul Lutfi Kirdar Covention and Exhibition Centre, Istanbul, Turkey (Poster presentation).

4) **Sujay Pal** and Sandip K. Chakrabarti, Numerical Modelling of VLF Radio Wave Propagation and Comparison with Observations, **International workshop on Seismo-Electromagnetics and Atmospheric Science (IWSE AS-2010)**, 16-18 November, 2010, Hotel Marina, Agra, India (Poster presentation).

3) **Sujay Pal** and Sandip K. Chakrabarti, Theoretical study of the Diurnal and Seasonal behaviour of VLF signals using wave-hop theory and waveguide mode theory, **AOGS 2010, 7th Annual Meeting and Geosciences World Community Exhibition**, 5-9 July, 2010, Hyderabad International Convention Centre, India (Oral presentation).

2) **Sujay Pal** and Sandip K. Chakrabarti, Theoretical study of the Diurnal and Seasonal behaviour of VLF signals and comparison with VLF campaign data, **First International Conference on Science with Very Low Frequency Radio Waves: Theory and Observations**, Kolkata, India, March 13-18, 2010 (Oral presentation).

1) **Sujay Pal** and Sandip K. Chakrabarti, Theoretical study of the diurnal behaviour of the VLF signals and comparison with VLF campaign data, **The Sharjah-Standford AWESOME VLF Workshop**, College of Sciences, University of Sharjah, UAE, Feb. 22-24, 2010 (Oral presentation).

Popular Lectures: India's Space Success and Chandrayaan, in a seminar on "50 Years of Moon Landing", 8th August, 2019, Harmasra High School, Bankura (In Bengali language).

RESEARCH TRAINING AND PARTICIPATION IN SCIENTIFIC ACTIVITIES

13) 1st E-SWAN school: Space Weather Data, Models and Services, Toulouse, France, Nov. 17-19, 2023, Organized by E-SWAN Working Group 9,STCE, The Solar-Terrestrial Centre of Excellence & IRAP – Research Institute in Astrophysics and Planetology.

12) Radar Training Workshop (Commission F), March 10, 2019, APRASC Pre-Conference Workshop, New Delhi.

11) Global Navigation Satellite System (GNSS) Workshop, March 09, 2019, APRASC Pre-Conference Workshop, Prithvi Bhavan, MOES, New Delhi

10) Participated in the "Brainstorming meeting on Stratosphere-Troposphere Radar", Organized by the Institute of Radio Physics and Electronics, University of Calcutta, 18-19 January, 2019, Kolkata.

9) Participated in the "**The Polar Upper Atmosphere: from Science to Operational Issues**", held in L'Aquila, Italy, September 1721, 2018, organized by the International Scholl of Space Science (ISSS), Italy.

8) Participated in the "**Workshop on Satellite Navigation and Application of GNSS/NavIC**" during 05-06 April, 2018 organized by the National Atmospheric Research Laboratory (NARL), Gadanki, India.

7) Actively participated in the 96th **Science Academies' Refresher Course in Experimental Physics, February 6-21, 2018**, Sidho-Kanho-Birsa University, Purulia, WB.

6) Participated in the Seminar on "Materials for Biomedical Engineering", 29th April, 2017, Department of Basic Science, Gargi Memorial Institute of Technology, Baruipur, Kolkata 700144.

5) Participated in the seminar **Natural Disaster Phenomena: Contemporary Developments**, Department of Atmospheric Sciences, Calcutta University, February 26, 2016.

4) Visited Moshiri observatory, Hokkaido, Japan and took part in installation of VLF receiving system, 8-11 May, 2014.

3) First Kolkata Workshop on Role of Small Telescopes in Modern Astronomy Research, November 7–8, 2011 at S. N. Bose National Centre for Basic Sciences, Kolkata.

2) Actively participated in Multi-station VLF Campaign organised by Indian Centre for Space Physics from 17th - 25th of July, 2009 and installed a VLF antenna/receiver at Benaras during the Total Solar Eclipse (TSE) of 22nd July, 2009.

1) Actively participated in Multi-station VLF Campaign organized by Indian Centre for Space Physics and installed a VLF antenna/receiver system at Physical Research Laboratory (PRL), Ahmedabad during 24th –31st December, 2008.

Referee Details:

1) Prof. Sandip Kumar Chakrabarti

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2) Prof. Subrata Kumar Midya

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Other Responsibilities:

- HOD of Department of Physics, Srikrishna College (2023-2025)
- Coordinator of Unnat Bharat Abhiyan, Srikrishna College
- Member of various committees including IQAC in Srikrishna College