

## **Janardhan Padmanabhan, FNA**

### **Currivulum Vitae**

#### **Brief bio-data:**

Name	:	<b>Janardhan Padmanabhan</b>
Date of Birth	:	15 February 1960
Marital Status	:	Married with two girl children aged 23 years and 19 years
Present Designation	:	Senior Professor (H) and INSA Senior Scientist, PRL
Address	:	53 Aarohi Homes, South Bopal, Ahmedabad – 380058, India
Email	:	<a href="mailto:Janardhan.Padmanabhan@gmail.com">Janardhan.Padmanabhan@gmail.com</a>
Mobile No	:	(+91)9428246845 (M)
Website	:	<a href="https://www.prl.res.in/~jerry">https://www.prl.res.in/~jerry</a> ; <a href="https://www.flickr.com/photos/jerryprl">https://www.flickr.com/photos/jerryprl</a>
Education	:	PhD in Physics – 1991, Gujarat University
Thesis Referee	:	Prof. Antony Hewish [ <b>FRS &amp; Nobel Laureate</b> ], Cavendish Lab., UK
Employment	:	Physical Research Laboratory, Ahmedabad, Gujarat, India (From Dec.1993 – Feb. 2020)
Refereed Research Publications	:	Over a 100 published – Publications from 2010 are attached at the end. However, for a full list of publications please see – The <a href="#">Refereed Publications Link</a> on my homepage.

### Scientific Space Payload Development:

1. I was the principle Investigator (PI – 2008 to 2020) of the **Aditya Solarwind Particle EXperiment (ASPEX)** Payload onboard India's first dedicated observatory-Class solar mission (**ADITYA-L1**) to the L1 Lagrangian point of the Sun-Earth system. ADITYA-L1 was launched on 02 Sept. 2023 and was inserted into a halo orbit around L1 on 06 January 2024.  
The ADITYA-L1 spacecraft carries onboard seven payloads, of which the ASPEX payload, was designed, developed and built by the Physical Research Laboratory, Ahmedabad, Gujarat, India. ASPEX aims to study solar and interplanetary processes that accelerate and energize Protons and Alpha particles in the inner heliosphere and importantly, their energies and directions of arrival both in and out of the ecliptic plane. It will observe these energetic particles over a very wide range of energies from 100 eV to 5 MeV. Since it is not possible to cover such a large energy range using a single instrument, ASPEX has been configured as two separate instruments viz. the Solar Wind Ion Spectrometer (SWIS), that measures the energy distribution and direction of arrival of Protons and Alpha particles in the energy range 100 eV to 20 keV. The second instrument, called the Suprathermal and Energetic Particle Spectrometer (STEPS) measures Proton and Alpha particle energy spectra, at a cadence of 1 sec, in the energy range from 20 keV to 5 MeV, using custom-built solid state Si detectors. These will be the first measurements, using a 3-axis stabilized spacecraft at the L1 Lagrangian point, covering such a large energy range and from multiple directions.
2. Member of the science team of the **Chandrayaan-2 X-Ray Solar Monitor (XSM)** payload which has been successfully producing science data and peer reviewed papers from 2020.
3. Member of the Science team of the **Space Electric and Magnetic Sensor (SEAMS)** payload to be carried onboard the IVth stage of the PSLV. This payload is being developed at Pune University.

### Brief Employment details:

Position	Institution	Period
1. Scientist	Physical Research Laboratory	31 Dec. 1993 to 29 Feb. 2020
2. INSA Senior Scientist	Physical Research Laboratory	01 November 2021 Onwards – Post Superannuation
2. Senior Professor (H)	Physical Research Laboratory	01 Jul. 2019 – 29 Feb. 2020
3. Senior Professor (G)	Physical Research Laboratory	01 Jan. 2016 – Jun. 2019
4. Professor and Dean, PRL, and member Scientific Advisory Committee	Physical Research Laboratory	01 Dec. 2015 – Feb. 2020

### Awards and Honours, Fellowships of Scientific Bodies

1. The Chandrayaan-2 CLASS payload and XSM payload teams were awarded the **ASI Zubin-Kembhavi Award** in 2024 for Observational and Instrumentation work in

Astronomy. The award, given annually, has been instituted by the Astronomical Society of India (ASI) and carries a cash prize of one lakh rupees and a plaque.

2. Elected **Fellow of the Indian National Science Academy (FNA)** in January 2020
3. Awarded the - **ISRO Merit Award - 2015**. The award is conferred for outstanding performance and high productivity. The award comprising a medal, a citation and a cash prize of Rs. 100,000/- is given annually.
4. Selected for the United Nations Programme on “Science and Data Products from ISWI Instruments”, Fukuoka, Japan – 2015 and endorsed by the **Committee on the Peaceful Uses of Outer Space and the United Nations General Assembly - 2015**
5. Awarded the - **Vikram Sarabhai Research Award in Space Sciences for the year 2003**. The award comprising of a medal plus a cash prize of Rupees Fifty Thousand is given bi-annually.
6. Awarded the **Alexander Von Humboldt Research Fellowship in Astrophysics for the year 1996** by the Alexander Von Humboldt Foundation, Bonn, Germany.
7. Was selected as a "**Young Astronomer**" in 1988 for the award of a **National Science Foundation (NSF, U.S.A.) grant** to attend the Twentieth General Assembly of the International Astronomical Union and Visit the Mullard Radio Astronomy Observatory, Cambridge, UK.

#### **Experience/Employment Outside India:**

1. **Alexander Von Humboldt Research Fellow, Govt. of Germany** (May 1996 – Dec. 1997)  
Radioastronomisches Institut  
Universität Bonn  
Bonn, Germany.
2. **Research Associate** (August 1999 – October 2000)  
Department of Astronomy  
University of Maryland  
College Park, USA
3. **Visiting Professor** (01 Sept. 2003 – 30 Nov. 2003)  
Institute for Space-Earth Environment (ISEE)  
Nagoya University, Japan.
4. **Visiting Professor** (Feb. 2007 – Jan. 2008)  
Instituto Nacional de Pesquisas (INPE)  
Divisao de Astrofisica, Brazil.
5. **Visiting Professor** (Feb 2008)  
Department of Applied Mathematics and Theoretical Physics,  
Cambridge, UK
6. **Visiting Professor** (May-Jun 2017)  
Institute for Space-Earth Environment (ISEE)  
Nagoya University, Japan.

#### **Research Supervision (Guiding Ph.Ds)**

1. PhD Guide for **Dr. Susanta Kumar Bisoi** – 2008-2012 [PhD degree awarded in 2013 from MLSU, Udaipur].
2. PhD co-guide for **Dr. V. Venkataraman** – 2011-2015 [PhD degree awarded in 2015 from MLSU, Udaipur]

3. PhD guide for **Dr. Priyanka Chaturvedi**; co-guide Prof. Abhijit Chakraborty, PRL (2010-2015) [PhD degree awarded in 2016 from MLSU, Udaipur].
4. PhD Co-Guide for **Mr. Rahul Kumar Kushwaha**; Guide Prof. Bhalamurugan Shivaraman – [PhD degree awarded in 2021 from MLSU, Udaipur]

#### **Membership of Scientific and Research Bodies:**

1. Individual Member URSI (MURSI)
2. Member National Committee of COSPAR-URSI-SCOSTEP
3. Member Union Radio-Scientifique Internationale (URSI)
4. Member of the International Astronomical Union (IAU).
5. Founding Member of the Indian Radio Science Society (InRaSS)

#### **Published Research Highlights:**

1. Recent Work on Ducting Emission Reported as a Science Nugget in Community of European Solar Radio Astronomers (CESRA) News  
<http://www.astro.gla.ac.uk/users/eduard/cesra/?p=1960>
2. An Article Entitled - A New Angle on the Effects of Solar Wind on a novel method of detecting geoeffective CIR was Published in Nature India doi:10.1038/nindia.2017.116 Published online – *Nature India*, 7 September 2017.  
<http://www.natureasia.com/en/nindia/article/10.1038/nindia.2017.116>
3. Recent work on Decimetric Emission far away from a flaring site was reported as a CESRA Science Nugget on 04 September 2018.  
<http://www.astro.gla.ac.uk/users/eduard/cesra/?p=1960>
4. An article entitled - Sun's reversed polarity field may affect Earth's climate was published in *Nature India* - 26 November 2018, doi:10.1038/nindia.2018.153  
<https://www.natureasia.com/en/nindia/article/10.1038/nindia.2018.153>
5. Current Science, which has a science news column that reports the recent publications by Indian scientists reported our work on a new method of predicting the amplitude of the next solar cycle (Publication #78 above).  
<https://www.currentscience.ac.in/Volumes/119/02/0167.pdf>

#### **Popular Articles:**

1. An article on our work was featured in *Times of India* entitled “ Sunspots point to Looming Little Ice Age.”  
[https://www.prl.res.in/prl-eng/documents/prl\\_in\\_news/April06-2016.pdf](https://www.prl.res.in/prl-eng/documents/prl_in_news/April06-2016.pdf)
2. An article on our work on declining solar photospheric magnetic fields was published in the ‘Science Wire’  
<https://science.thewire.in/the-sciences/solar-magnetic-field-sunspots-solar-cycle-25-maunder-minimum/>
3. Our work on ‘**N-Graphene Synthesized in Astrochemical Ices**’ was reported in “Astrobites”, a collaboration of graduate students that take scientific articles and condense them down into bite-size pieces that the public can understand.  
<https://astrobites.org/2020/09/15/template-post-2-2-2/>.
4. An article in the *Washington Post* referred to our work on Solarwind Disappearance Events, which I have studied extensively.  
<https://www.washingtonpost.com/climate-environment/2023/12/16/solar-wind-mars-earth-water/>

## Book Chapter:

- **The Solar Wind and Interplanetary Disturbances.**  
**Janardhan, P.**, (2003). *Solar Terrestrial Environment – Space Weather*, Allied Publishers, New Delhi., pp. 42–56. **Eds. R.P. Singh, Rajesh Singh & Ashok Kumar**, Banaras Hindu University, Varanasi, India. **ISBN: 81–7764–494–7**

## Organisation of Conferences/Summer Schools, etc.

- I. 2nd URSI Regional Conference on Radio Science 2015 (URSI-RCRS 2015) New Delhi, India, from 16 to 19 November 2015.
- II. APRASC- 2019: URSI Asia-Pacific Radio Science Conference (AP-RASC 2019), New Delhi, India from 09 – 15 March, 2019.

## Refereed Research Publications – 2010 to Present

Click here for a [Full list of Publications](#)]

1. **Solar Polar Fields During Cycles 21 - 23: Correlation with Meridional Flows.**  
**Janardhan, P.**, Susanta Kumar Bisoi and Gosain, S., (2010). *Sol. Phys.* **267**, 267–277.
2. **Unique Observations of Geomagnetic  $SI^+$  -  $SI^-$  pair and Solar Wind Fluctuations.**  
Rastogi, R.G., **Janardhan, P.**, Ahmed, K., Das, A.C. and Susanta Kumar Bisoi (2010). *Jou. Geophys. Res.* **115**, A12110, doi:10.1029/2010JA015708.
3. **The Prelude to the Deep Minimum between Solar Cycles 23 and 24: Interplanetary Scintillation Signatures in the Inner Heliosphere**  
**Janardhan, P.**, Susanta Kumar Bisoi, Ananthkrishnan, S., Tokumaru, M., Fujiki, K., (2011). *Geophys. Res. Lett.*, **38**, L20108, doi:10.1029/2011GL049227.
4. **Deep GMRT 150 MHz observations of the DEEP2 fields: Searching for High Red-shift Radio Galaxies Revisited**  
Susanta Kumar Bisoi., Ishwara-Chandra, C.H., Sirothia, S.K., and **Janardhan, P.** (2011). *Jou. Astrophys. Astr.* **32**, 613–614. DOI: 10.1007/s12036-011-9116-2.
5. **Near-Infrared Monitoring and Modelling of V1647 Ori in its On-going 2008-12 Outburst Phase**  
Venkata Raman, V., Anandarao, B.G., **Janardhan, P.** and Pandey, R. (2013). *Res. Astron. Astrophys.* **13**, No. **9**, 1107–1117.
6. **Changes in quasi-periodic variations of solar photospheric fields: precursor to the deep solar minimum in the cycle 23?**  
Susanta Kumar Bisoi, **Janardhan, P.**, Chakrabarty, D., Ananthkrishnan, S. and Divekar, A. (2014). *Sol. Phys.* **289**, 41–61. DOI: 10.1007/s11207-013-0335-3.
7. **Spread-F during the magnetic storm of 22 January 2004 at low latitudes: Effect of IMF- $B_z$  in relation to local sunset time**  
Rastogi, R.G., Chandra, H., **Janardhan, P.**, Thai Lan Hoang, Louis Condori, Pant, T.K., Prasad, D.S.V.V.D. and Reinish, B.W. (2014). *Jou. Earth System Sci.* **123**, 1273–1285.
8. **Determination of mass and orbital parameters of a low-mass star HD 213597B**  
Priyanka Chaturvedi, Rohit Deshpande, Vaibhav Dixit, Arpita Roy Abhijit Chakraborty, Suvrath Mahadevan, B.G. Anandarao, Leslie Hebb and **P. Janardhan** (2014). *MNRAS* **442**, 3737–3744, DOI: 10.1093/mnras/stu1127.
9. **A study of density modulation index in the inner solar wind during solar cycle 23**  
Susanta Kumar Bisoi, **P. Janardhan**, M. Ingale and P. Subramanian, and S. Ananthkrishnan (2014). *Atrophysical Journal* **795**, 69–76.
10. **Equatorial and mid-latitude ionospheric currents over the Indian region based on 40 years of data at Trivandrum and Alibag**  
Rastogi, R.G., Chandra, H., **Janardhan, P.**, and Rahul Shah (2014). *IJRSP* **43**, 274–283.

11. **The Structure of Solar Radio Noise Storms.**  
C. Mercier, Prasad Subramanian, G. Chambe, [Janardhan, P.](#), (2015). [A&A](#), **576**, A136
12. **A Twenty Year Decline in Solar Photospheric Magnetic Fields: Inner-Heliospheric Signatures and Possible Implications?**  
[P. Janardhan](#), Susanta Kumar Bisoi, S. Ananthakrishnan, Tokumaru, M., and Fujiki, K., Jose, L., and Sridharan, R. (2015). [Jou. Geophys. Res.](#) **120**, 5306--5317, doi:10.1002/2015JA021123.
13. **Solar and Interplanetary Signatures of a Maunder-like Grand Solar Minimum around the Corner - Implications to Near-Earth Space**  
[P. Janardhan](#), Susanta Kumar Bisoi, S. Ananthakrishnan, R. Sridharan and L. Jose (2015). [Sun and Geosphere](#) **10**, No. 2, 147--156.
14. **A Prolonged Southward IMF-Bz Event of May 02 -- 04, 1998: Solar, Interplanetary Causes, and Geomagnetic Consequences**  
Susanta Kumar Bisoi, Chakrabarty, D., [Janardhan, P.](#), Rastogi, R.G., Yoshikawa, A., Fujiki, K., Tokumaru, M., and Yan, Y. (2016). [Jou. Geophys. Res.](#) **121**, 3882 -- 3904, doi:10.1002/2015JA022185.
15. **J1216+0709: A Radio Galaxy with Three Episodes of AGN Jet Activity**  
Veeresh Singh, Ishwara-Chandra, C.H., Preeti Kharb, Shweta Srivastava [Janardhan, P.](#), (2016). [ApJ](#) **826**, 132--137, doi:10.3847/0004-637X/826/2/132.
16. **Star formation activity in the neighbourhood of WR 1503-160L star in the mid-infrared bubble N46**  
Dewangan, L.K., Baug, T., Ojha, D.K., [Janardhan, P.](#) Ninan, J. P., Luna, A. and Zinchenko, I. (2016). [ApJ](#) **826**, 27--55, doi: 10.3847/0004-637X/826/1/27.
17. **Amplitude of solar wind density turbulence from 10 R<sub>s</sub> - 45 R<sub>s</sub>**  
K. Sasikumar Raja, Madhusudan Ingale, R. Ramesh, Prasad Subramanian, P. K., Manoharan and [P. Janardhan](#). (2016). [Jou. Geophys. Res](#) **121**, A10, DOI: 10.1002/2016JA023254.
18. **A 20 year decline in solar magnetic fields and solar wind micro-turbulence levels: Are we heading towards a Maunder-like minimum?**  
[Janardhan, P.](#), Bisoi, S. K., and Ananthakrishnan, S. (2016). [Proc. URSI-APRASC-2016](#) pp: 1079--1082.
19. **The physical environment around IRAS 17599-2148: Infrared dark cloud and bipolar nebula**  
Dewangan, L.K., Ojha, D.K., Zinchenko, [Janardhan, P.](#), Ghosh, S.K. and Luna, A. (2016). [ApJ](#) **833**, doi: 10.3847/1538-4357/833/2/246.
20. **Multi-wavelength study of the star-formation in the S237 HII Region**  
Dewangan, L.K., Ojha, D.K., Zinchenko, [Janardhan, P.](#) and Luna, A. (2017). [ApJ](#) **834**, doi: 10.3847/1538-4357/834/1/22.
21. **Solar wind flow angle and geo-effectiveness of corotating interaction regions: First results**  
Diptiranjan Rout, Chakrabarty, D., [Janardhan, P.](#), Sekar, R., Vrunda Maniya and Kuldeep Pandey (2017). [Geophys. Res. Lett.](#) **44**, 4532-4539 DOI: 10.1002/2017GL073038.
22. **Probing the heliosphere using in-situ payloads on-board Aditya-L1**  
[Janardhan, P.](#), Santosh Vadawale, Bhas Bapat, Subramanian, K. P., Chakrabarty D., Prashant Kumar, Aveek Sarkar, Nandita Srivastava, Satheesh Thampi R., Vipin K. Yadav, Dhanya M. B., Govind G. Nampoothiri, Abhishek J. K., Anil Bhardwaj and Subhalakshmi K. (2017). [Current Science](#) **113**, No. 4, 620-624, DOI: 10.18520/cs/v113/i04/620-624 .
23. **An Infrared Photometric and Spectroscopic Study of Post-AGB Stars**  
Venkata Raman, V., Anandarao, B. G., [Janardhan, P.](#), and Pandey, R. (2017). [MNRAS](#) **470**, 1593-1611. DOI:10.1093/mnras/stx1237.
24. **Post sunset equatorial spread-F at Kwajalein and interplanetary magnetic field**  
Rastogi, R.G., Chandra, H., [Janardhan, P.](#), Reinisch, B.W. and Susanta Kumar Bisoi (2017). [Jou. Adv. Space Res.](#) **60**, 1708-1715.



25. **The molecular cloud S242: Physical environment and star formation activities**  
Dewangan, L.K., Baug, T., Ojha, D.K., **Janardhan, P.**, Devraj, R., and Luna, A., (2017). *ApJ* **845**, 34-47.
26. **Effect of Solar Flare on the Equatorial Electrojet in the Eastern Brazil Region**  
Rastogi, R.G., **Janardhan, P.**, Chandra, H., Trivedi, N.B., and Vidal Erick, (2017). *JESS* ,**126**, 51. DOI:10.1007/s12040-017-0837-8.
27. **Aditya Solarwind Particle EXperiment (ASPEX) onboard the Aditya-L1 Mission**  
S. K. Goyal, P. Kumar **Janardhan, P.**, S. V. Vadawale, A. Sarkar, M. Shanmugam, K. P. Subramanian, B. Bapat, D. Chakrabarty,P. R. Adhyaru, A. R. Patel, S. B. Banerjee, Manan S. Shah, Neeraj K. Tiwari, H. L. Adalja, T. Ladiya, M. B. Dadhania, A. Sarda, A. K. Hait, M. Chauhan and R. R. Bhavsar (2018). *Planetary Space Sci.* **163**, 42-55.
28. **Decimetric emission 500" away from a flaring site: possible scenarios from GMRT solar radio observations**  
Susanta Kumar Bisoi., Sawant, H.S., **Janardhan, P.**, Yan, Y., Chen, L., Arun Kumar Awasthi., Shweta Srivastava and Gao, G. (2018). *ApJ.*, **862**, 65-79.
29. **Solar Polar Fields During Cycle 24: An Unusual Polar Field Reversal**  
**Janardhan, P.**, Fujiki, K., Ingale, M., Susanta Kumar Bisoi and Diptiranjana Rout (2018). *A&A* **618**, A148.
30. **Beyond the mini-solar maximum of solar cycle 24: Declining solar magnetic fields and the response of the terrestrial magnetosphere**  
Ingale, M., **Janardhan, P.**, and Susanta Kumar Bisoi., (2019). *Jou. Geophys. Res*, 124, DOI: <https://doi.org/10.1029/2019JA026616>
31. **Global solar magnetic field and interplanetary scintillations during the past four solar cycles**  
Sasikumar Raja., **Janardhan, P.**, Susanta Kumar Bisoi, Ingale, M., Prasad Subramanian, Fujiki, K., Maksimovic, M. (2019). *Sol. Phys.*, **294**, 123-136, DOI: <https://doi.org/10.1007/s11207-019-1514-7>
32. **Infrared attenuation due to phase change from amorphous to crystalline observed in astrochemical propargyl ether ices.**  
Rahul, K.K., Meka,J.K., Pavithraa,S., Gorai, P., Das, A., Lo, J.-I., Rajasekhar, B.N., Cheng, B.-M., **Janardhan, P.**, Bhardwaj, A., Mason, N.J., and Sivaraman, B. (2020). *Spectrochimica Acta*, **224**, DOI: <https://doi.org/10.1016/j.saa.2019.117393>
33. **Residue from vacuum ultraviolet irradiation of benzene ices: Insights into the physical structure of astrophysical dust**  
Rahul, K.K., Shiva, K., Meka,J.K., Das, A., Vijayanand, C., Rajasekhar, B.N., Lo, J.-I., Cheng, B.-M., **Janardhan, P.**, Bhardwaj, A., Mason, N.J., and Sivaraman, B. (2020). *Spectrochimica Acta*, DOI: <https://doi.org/10.1016/j.saa.2019.117797>. Also appeared on the cover page of ASTROPAH Newsletter as “**Picture of the Month**”  
<https://pubs.rsc.org/en/content/articlelanding/2020/CP/C9CP05440E#!divAbstract>
34. **A New Tool for Predicting the Solar Cycle: Correlation between Flux Transport at the Equator and the Poles**  
Susanta Kumar Bisoi & **Janardhan, P.**, (2020). *Sol. Phys.*, **295**, 79, DOI: 10.1007/s11207020-01645-9.
35. **Another Mini Solar Maximum in the Offing: A Prediction for the Amplitude of Solar Cycle 25**  
Susanta Kumar Bisoi., **Janardhan, P.** and Ananthakrishnan, S. (2020). *JGR*, **125**, e2019JA027508. DOI: <https://doi.org/10.1029/2019JA027508>.
36. **Solar X-Ray Monitor on Board the Chandrayaan-2 Orbiter: In-Flight Performance and Science Prospects**  
Mithun, N. P. S.; Santosh V.; Sarkar, Aveek; Shanmugam, M.; Patel, Arpit R.; Mondal, Biswajit; Joshi, Bhuwan; **Janardhan, P.**; Adalja, Hiteshkumar L.; Goyal, Shiv Kumar; Ladiya, Tinkal; Tiwari, Neeraj Kumar; Singh, Nishant; Kumar, Sushil; Tiwari, Manoj K.; Modi, M. H.; Anil Bhardwaj (2020). *Sol. Phys.*, **295**, 139, DOI: 10.1007/s11207-020-01712-1.

37. **Gauging the Sun's Mood: A New Baramoter**  
Janardhan, P. (2020). [Current Science News Reports](https://www.currentscience.ac.in/Volumes/119/02/0167.pdf), **119**, DOI: 10.1007/s11207-020-01645-9  
<https://www.currentscience.ac.in/Volumes/119/02/0167.pdf>
38. **Ground calibration of Solar X-ray Monitor on board the Chandrayaan-2 orbiter**  
Mithun, N. P. S.; Santosh V.; Shanmugam, M.; Patel, Arpit R.; Tiwari, Neeraj Kumar; Adalja, Hiteshkumar L.; Goyal, Shiv Kumar; Ladiya, Tinkal; Singh, Nishant; Kumar, Sushil; Tiwari, Manoj K.; Modi, M. H.; Mondal, Biswajit; Sarkar, Aveek; Joshi, Bhuwan; Janardhan, P.; Anil Bhardwaj (2021). *Expt. Astronomy*, **51**, 33-60, DOI: 10.1007/s10686-020-09686-5
39. **Observations of the Quiet Sun During the Deepest Solar Minimum of the Past Century with Chandrayaan-2 XSM - Elemental Abundances in the Quiescent Corona**  
Santosh V. ,1 Biswajit Mondal , N. P. S. Mithun , Aveek Sarkar , Janardhan, P., Bhuwan Joshi , Anil Bhardwaj, M. Shanmugam, Arpit R. Patel , Hitesh Kumar L. Adalja, Shiv Kumar Goyal , Tinkal Ladiya, Neeraj Kumar Tiwari, Nishant Singh, and Sushil Kumar. (2021). *ApJ. Lett.*, **912**, L12, DOI: 10.3847/2041-8213/abf35d
40. **Observations of the Quiet Sun During the Deepest Solar Minimum of the Past Century with Chandrayaan-2 XSM - Sub-A Class Microflares Outside Active Regions**  
Santosh V., N. P. S. Mithun, Biswajit Mondal, Aveek Sarkar, Janardhan, P., Bhuwan Joshi, Anil Bhardwaj, M. Shanmugam, Arpit R. Patel ,1 Hitesh Kumar L. Adalja, Shiv Kumar Goyal , Tinkal Ladiya, Neeraj Kumar Tiwari, Nishant Singh, and Sushil Kumar. (2021). *ApJ. Lett.*, L13, DOI: 10.3847/2041-8213/abf0b0.
41. **Evolution of Elemental Abundances during B-Class Solar Flares: Soft X-Ray Spectral Measurements with Chandrayaan-2 XSM**  
Biswajit Mondal, Aveek Sarkar, Santosh V. Vadawale , N. P. S. Mithun, P. Janardhan , Giulio Del Zanna, Helen E. Mason, Urmila Mitra-Kraev, and S. Narendranath. (2021). *ApJ*, **920**, 4, DOI: <https://iopscience.iop.org/article/10.3847/1538-4357/ac14c1>
42. **Multiwavelength Observations by XSM, Hinode, and SDO of an Active Region. Chemical Abundances and Temperatures**  
G. Del Zanna, B. Mondal, Y. K. Rao, N. P. S. Mithun, S. V. Vadawale, K. K. Reeves, H. E. Mason, A. Sarkar, P. Janardhan, and A. Bhardwaj. (2022). *ApJ*, **934**, 159, DOI: <https://iopscience.iop.org/10.3847/1538-4357/ac7a9a>.
43. **Shock Induced Transformation of Non-Magnetic to Magnetic ISM Dust Analogue.**  
Arijit Roy, V. S. Surendra, J. K. Meka, R. Ramachandran, D. Sahu, A. Goutam, T. Vijay, V. Jayaram, P. Janardhan, B. N. Rajasekhar, Anil Bhardwaj, N. J. Mason, and B. Sivaraman. (2022). *MNRAS*, **517**, 4845–4855, DOI: <https://doi.org/10.1093/mnras/stac2637>
44. **Soft X-ray Spectral Diagnostics of Multi-thermal Plasma in Solar Flares with Chandrayaan-2 XSM**  
N. P. S. Mithun, Santosh V. Vadawale, Giulio Del Zanna, Yamini K. Rao, Bhuwan Joshi, Aveek Sarkar, Biswajit Mondal, P. Janardhan, Anil Bhardwaj, and Helen E. Mason, (2022). *ApJ*, **939**, 112, DOI: [10.3847/1538-4357/ac98b4](https://doi.org/10.3847/1538-4357/ac98b4)
45. **Multiwavelength Observations by XSM, Hinode, and SDO of an Active Region. Chemical Abundances and Temperatures**  
G. Del Zanna, B. Mondal, Y. K. Rao, N. P. S. Mithun, S. V. Vadawale, K. K. Reeves, H. E. Mason, A. Sarkar, P. Janardhan, and Anil Bhardwaj. (2022). *ApJ*, **934**, 159, <https://iopscience.iop.org/article/10.3847/1538-4357/ac7a9a>
46. **Shock Processing of Amorphous Carbon Nanodust**  
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