

## M. V. SUNIL KRISHNA PhD

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Associate Professor  
Department of Physics  
Indian Institute Technology Roorkee  
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### EDUCATION

**Indian Institute of Technology Roorkee**  
**PhD in Physics**  
Concentration: Atmospheric Physics

Department of Physics  
April 2010

**University of Hyderabad**  
**M.Phil in Physics**  
Concentration: Theoretical High Energy Physics

School of Physics  
September 2004  
Percentage: 72

**Sri Venkateswara University, Tirupati**  
**M.Sc. in Physics**  
Concentration: Physics with Electronics

Department of Physics  
July 2002  
Percentage: 74

**Sri Krishnadevaraya University, Anantapur**  
**B.Sc. in Science**  
Concentration: Mathematics, Physics, Chemistry

S.S.B.N.College  
April 2000  
Percentage: 79

### PROFESSIONAL EXPERIENCE

- ◇ Post Doctoral Fellow in Space and Atmospheric Sciences division at Physical Research Laboratory, Ahmedabad during 2010-2011
- ◇ Assistant Professor in Physics at Indian Institute of Technology Roorkee during 2011-2019
- ◇ Associate Professor in Physics at Indian Institute of Technology Roorkee since 2019

### RESEARCH INTERESTS

- ◇ Atmospheric & Space physics, Space weather, Atmospheric Modeling
- ◇ MLTI Interaction and coupling, Airglow and Aurora
- ◇ Artificial Intelligence applications in remote sensing, Satellite data
- ◇ Solar Terrestrial interactions, mesospheric sodium airglow

### PROFESSIONAL ASSOCIATESHIP

- ◇ American Geophysical Union (AGU)
- ◇ European Geosciences Union (EGU)
- ◇ Committee on Space Research (COSPAR)
- ◇ Indian Physics Association (IPA)

**MAJOR  
REVIEWER  
ASSIGNMENTS**

- ◇ Journal of Geophysical Research
- ◇ Advances in Space Research
- ◇ Journal of Atmospheric and Solar Terrestrial Physics
- ◇ Climate Dynamics
- ◇ Atmosphere
- ◇ Current Science
- ◇ Pramana, Journal of Physics

**PH.D  
SUPERVISION**

- ◇ Dr. Tikemani Bag (CSIR) Graduated in 2016 worked on topics related to the modeling of Na airglow emission and study of mesospheric dynamics.
- ◇ Dr. Gaurav Bharti (MHRD) Graduated in 2019 worked on topics related to space weather effects on Earth's neutral atmosphere and ionosphere.

**SPONSORED  
RESEARCH**

- ◇ Title: Study of thermospheric and mesospheric cooling by using Nitric Oxide radiative emissions  
Agency: DST-SERB, Budget: 36.8 lacs, Duration: 2018-2021, Role: PI
- ◇ Title: Airglow imaging and atmospheric studies  
Agency: DST-SERB, Budget: 74.5 lacs, Duration: 2017-2020, Role: Co-PI

**ACHIEVEMENTS  
& AWARDS**

- ◇ Recipient of Scholarship for outstanding merit in B.Sc.
- ◇ Qualified all India Graduate Aptitude Test (**GATE**) in Physics (AIR-240)
- ◇ Recipient of Doctoral Scholarship from MHRD, New Delhi
- ◇ Recipient of Senior Research Fellowship (SRF) from CSIR, New Delhi
- ◇ Recipient of Lloyd V. Berkner award from AGU, USA
- ◇ Recipient of COSPAR assistantship for lunar surface science
- ◇ Recipient (twice) of ITS by DST, New Delhi
- ◇ Recipient of COSPAR grant, COSPAR Scientific Assembly, 2018
- ◇ Recipient of assistantship from SCOSTEP
- ◇ Recipient of SSTSG, Shastri Indo-Canadian Institute

**IMPORTANT  
INTERNATIONAL  
CONFERENCES  
&  
ACADEMIC  
VISITS**

- ◇ COSPAR Scientific Assembly, Bremen, 2010
- ◇ Harbin Institute of Technology, China, 2009
- ◇ SCOSTEP Solar Terrestrial Physics Symposium, Berlin, 2010
- ◇ American Geophysical Union Fall Meeting, San Francisco, 2011
- ◇ American Geophysical Union Fall Meeting, San Francisco, 2013
- ◇ IUGG General assembly, Prague, 2015
- ◇ JpGU-AGU General Assembly, Tokyo, 2017
- ◇ University of Electrocommunications, Tokyo, 2017
- ◇ SCOSTEP STP-16, York University, Toronto, 2018
- ◇ COSPAR Scientific Assembly, Pasadena (2018), Athens (2022)
- ◇ International Symposium on Equatorial Aeronomy, Kyoto, 2022

## PUBLICATIONS

### Articles in Journals

1. Sunil Krishna MV Singh V: Testing of Solar2000 EUV flux model between 900-1350 Å using greenline dayglow emission, *Ind. J. Radio. Space.*, 38, 37-41, 2009.
2. Singh V, MV Sunil Krishna: Effect of temperature dependent rate coefficient of reaction  $N_2(A^3\Sigma_u^+) + O$  on proton heating efficiency in auroral region, *Ind. J. Radio. Space.*, 39, 71-73, 2009.
3. Sunil Krishna MV, Singh V: Effect of solar activity on the morphology of 7320 Å dayglow emission, *Ann. Geophys.*, 27, 4089-4096, 2009. [I.F: 2.190](#)
4. Singh V, Upadhyaya A K and MV Sunil Krishna: Modeling of redline dayglow emissions, *J. Hung. Met. Serv (IDŐJÁRÁS)*, 114, 217-227, 2010. [I.F: 1.089](#)
5. Sunil Krishna MV, Singh V: Morphology of 8446 Å dayglow emission, *J. Adv. Space. Res.*, 46, 81-88, 2010. [I.F: 2.611](#)
6. Sunil Krishna MV, Singh V: Solar influence on redline dayglow emission under equinox conditions, *J. Atmos. Sol. Terr. Phys.*, 73, 499-506, 2011. [I.F: 2.119](#)
7. Sunil Krishna MV, Sandeep Kaur, V Singh: Heating of ambient electrons in thermosphere under varying solar activity conditions, *Ind. J. Radio. Space.*, 40, 130-136, 2011.
8. Thirupathaiah P, MV Sunil Krishna, V Singh: Effect of solar activity on peak emission rate of 557.7 nm dayglow emission under equinox conditions, *J. Atmos. Sol. Terr. Phys.*, 77, 209-218, 2012. [I.F: 2.119](#)
9. Thirupathaiah P, V Singh, MV Sunil Krishna: An analytical approach to estimate the atomic oxygen density from greenline dayglow emission in thermosphere at 250 km, *Ind. J. Radio. Space.*, 42, 219-228, 2013.
10. Bag T, MV Sunil Krishna, Shilpa Gahlot, V Singh: Effect of severe geomagnetic storm conditions on atomic oxygen greenline dayglow emission in mesosphere, *J. Adv. Space. Res.*, 53, 1255-1264, 2014. [I.F: 2.611](#)
11. Bag T, MV Sunil Krishna, V Singh: Modeling of Na airglow emission and first results on the nocturnal variation at a mid-latitude, *J. Geophys. Res.*, 120, 10945-10958, 2015. [I.F: 3.11](#)
12. Bag T, V Singh, MV Sunil Krishna: Study of atomic oxygen greenline dayglow emission in thermosphere during geomagnetic storm conditions, *J. Adv. Space. Res.*, 59, 302-310, 2017. [I.F: 2.611](#)
13. Bharti G, T Bag, MV Sunil Krishna: Effect of geomagnetic storm conditions on the equatorial ionization anomaly and equatorial temperature anomaly, *J. Atmos. Sol. Terr. Phys.*, 168, 8-20, 2018. [I.F: 2.119](#)
14. Bharti G, MV Sunil Krishna, T Bag, Puneet Jain: Storm-time variation of radiative cooling by Nitric Oxide as observed by TIMED-SABER and GUVI, *J. Geophys. Res: Space Physics*, 123, 1500-1514, 2018. [I.F: 3.11](#)

15. Mondal S, A Srivastava, V Yadav, S Sarkhel, MV Sunil Krishna, Y K Rao, V Singh: Allsky airglow imaging observations from Hanle, Leh Ladakh, India: Image analyses and first results, *J. Adv. Space. Res.*, 64, 1926-1939, 2019. [I.F: 2.611](#)
16. Gaurav Bharti, MV Sunil Krishna, V Singh: Radiative cooling due to NO at 5.3  $\mu\text{m}$  emission as observed by TIMED/SABER over Asian sector, *J. Adv. Space. Res.*, 64, 1989-2001, 2019. [I.F: 2.611](#)
17. Sivakandan M, S Mondal, S Sarkhel, D Chakrabarty, MV Sunil Krishna, P Pavan Chaitanya, AK Patra, RK Choudhary, TK Pant, AK Upadhayaya, Takuya Sori: Mid-latitude spread-F structures over the geomagnetic low-mid latitude transition region: An observational evidence, *J. Geophys. Res.*, 125, 27531, 2020. [I.F: 3.11](#)
18. Yadav V, R Rathi, S Sarkhel, D Chakrabarty, MV Sunil Krishna, AK Upadhayaya: A unique case of complex interaction between MSTIDs and mid-latitude field-aligned plasma depletions over geomagnetic low-mid latitude transition region, *J. Geophys. Res.*, 126, 28620, 2021. [I.F: 3.11](#)
19. Mondal S, M Sivakandan, S Sarkhel, MV Sunil Krishna, Martin G Mlynchzak, James M Russell, G Bharti: A case study of a thermally ducted undular mesospheric bore accompanied by ripples over the western Himalayan region, *Adv. Space. Res.*, 68, 1425-1440, 2021. [I.F: 2.611](#)
20. Rathi R, V Yadav, S Mondal, S Sarkhel, MV Sunil Krishna, A K Upadhayaya: Evidence for simultaneous occurrence of periodic and single dark band MSTIDs over geomagnetic low-mid latitude transition region, *J. Atmos. Sol-Terr. Phys.*, 215, 2021. [I.F: 2.119](#)
21. Yadav V, R Rathi, G Gaur, S Sarkhel, D Chakrabarty, MV Sunil Krishna, P Pavan Chaitanya, A K Patra, RK Choudhary, T K Pant, A K Upadhayaya: Interaction between nighttime MSTID and mid-latitude field-aligned plasma depletion structure over the transition region of geomagnetic low-mid latitude: First results from Hanle, India, *J. Atmos. Sol-Terr. Phys.*, 217, 2021. [I.F: 2.119](#)
22. Mondal S, M Sivakandan, S Sarkhel, MV Sunil Krishna, Martin G Mlynchzak: A case study of thermally ducted undular mesospheric bore accompanied by ripples over the western Himalayan region, *Adv. Space. Res.*, 68, 1425-1440, 2021. [I.F: 2.611](#)
22. Sivakandan M, S Mondal, S Sarkhel, D Chakrabarty, MV Sunil Krishna, AK Upadhayaya, A Shinbori, T Sori, S Kannaujiya, PK Champati ray: Evidence of In-situ generation of plasma depletion structures over the transition region of geomagnetic low-mid latitude, *J. Geophys. Res.*, 126, e8837, 2021. [I.F: 3.11](#)
23. Guharay A, S Mondal, S Sarkhel, M Sivakandan, MV Sunil Krishna: Signature of a mesospheric bore in 557.7 nm airglow emission using all-sky imager at Hanle, *Adv. Space. Res.*, 69, 2020-2030, 2022. [I.F: 2.611](#)
24. Rathi R, V Yadav, S Mondal, S Sarkhel, MV Sunil Krishna, A K Upadhayaya, S Kannaujiya, P Chauhan: A case study on the interaction between MSTIDs fronts, their dissipation and a curious case of MSTIDs rotation over geomagnetic low-mid latitude transition region, *J. Geophys. Res.*, 127, 29872, 2022. [I.F: 3.11](#)
25. Alok Ranjan, MV Sunil Krishna, Akash Kumar, Gaurav Bharti, S Sarkhel, Miriam Sinnhuber, Stefan Bender: Aspects related to variability of radiative cooling by NO in lower thermosphere, TEC and O/N<sub>2</sub> correlation, and diffusion of NO into mesosphere during the Halloween storms, *Adv. Space. Res.*, 71, 29-45, 2023. [I.F: 2.611](#)

## Papers Presented in Conferences

1. Singh, V and Sunil Krishna, MV: Relative study of 5577 Å and 6300 Å dayglow emissions, *14<sup>th</sup> National Space Science Symposium*, Andhra University, Visakhapatnam, 9-11 February, 2006.
2. Sunil Krishna, MV, Singh V: Testing of Solar2000 flux model between 950 and 1175 Å wavelength region using greenline dayglow emission, *15<sup>th</sup> National Space Science Symposium*, Radio Astronomy Center, Ooty, 26-29 February, 2008.
3. Sunil Krishna MV and Singh V: Effect of varying solar activity on 844.6 nm and 732.0 nm dayglow emissions, *Radio and Environment Sciences: National Seminar*, National Physical Laboratory, New Delhi, 22-23 April, 2009.
4. Singh V and Sunil Krishna MV: Polar thermospheric heating under proton precipitation, *IGA 2009 General Assembly*, Sopron, Hungary, 23-30 August, 2009.
5. Sunil Krishna MV and Singh V: Effect of varying solar activity on the 732.0 nm airglow emission, *16<sup>th</sup> National Space Science symposium*, Saurashtra University, Rajkot, 24-27 February, 2010.
6. Singh V, Sunil Krishna MV: Morphological study of 844.6 nm dayglow emission, *16<sup>th</sup> National Space Science Symposium*, Saurashtra University, Rajkot, 24-27 February, 2010.
7. Sunil Krishna MV, Singh V: Morphology of redline dayglow emission under varying solar activity conditions, *SCOSTEP's STP-12 Symposium*, Institute of Atmospheric Physics, Berlin, Germany, 12-16 July, 2010.
8. Sunil Krishna MV, Singh, V.: Modeling of 557.7 nm dayglow emission under varying solar activity conditions, *38<sup>th</sup> COSPAR Scientific Assembly*, Bremen, Germany, 18-25 July, 2010.
9. Singh V, MV Sunil Krishna: Response of redline dayglow emission under varying solar activity conditions, *AGU Fall Meeting*, San Francisco, USA, 13-17 December, 2010.
10. Sunil Krishna MV, Singh, V: Heating of ambient electrons in thermosphere under varying solar activity conditions, *AGU Fall Meeting*, San Francisco, USA, 05-09 December, 2011.
11. Sunil Krishna MV, Maneesha Dharwan, P Thirupathaiah, Singh V: A study of latitudinal variation of greenline dayglow emission with solar activity, *17<sup>th</sup> National Space Science Symposium*, Sri Venkateswara University, Tirupati, 14-17 February, 2012.
12. P Thirupathaiah, Tikemani Bag, Singh V, MV Sunil Krishna: Estimation of atomic oxygen density from green line dayglow emission in thermosphere above 200km, *17<sup>th</sup> National Space Science Symposium*, Sri Venkateswara University, Tirupati, 14-17 February, 2012.
13. Sunil Krishna MV: A comparative study of model and empirical calculations of atomic oxygen greenline dayglow emission, *39<sup>th</sup> COSPAR Scientific Assembly*, Mysore, 14-22 July, 2012.
14. Sunil Krishna MV, Tikemani Bag.: Effect of severe geomagnetic disturbances on the atomic oxygen airglow emissions, *AGU Fall Meeting*, San Francisco, USA, 9-13 December, 2013.
15. Tikemani Bag, Gaurav Bharti, MV Sunil Krishna: Effect of severe geomagnetic storm conditions on greenline dayglow emissions, *18<sup>th</sup> National Space Science Symposium*, Dibrugarh University, Dibrugarh, 29 February-1 March, 2014.

16. Sunil Krishna MV, Tikemani Bag: Connection between neutral densities and geomagnetic activity, *26<sup>th</sup> IUGG General Assembly*, Prague, Czech Republic, 22 June-2 July, 2015.
17. Tikemani Bag, MV Sunil Krishna, Vir Singh: Signature of geomagnetic storm on equatorial ionization anomaly (EIA): *19<sup>th</sup> National Space Science Symposium*, Trivandrum, 9-12 February, 2016.
18. Gaurav Bharti, and MV Sunil Krishna: SABER/TIMED Observation of infrared cooling over Asian sector, *19<sup>th</sup> National Space Science Symposium*, Trivandrum, 9-12 February, 2016.
19. Tikemani Bag, MV Sunil Krishna: Mesospheric sodium airglow emission: Modeling and first results over a mid-latitude, *41<sup>st</sup> COSPAR Scientific Assembly*, Istanbul, Turkey.
20. Sunil Krishna MV.: Storm time variation of radiative cooling of thermosphere by nitric oxide emission, *41<sup>st</sup> COSPAR Scientific Assembly*, Istanbul, Turkey.
21. Sunil Krishna MV, Tikemani Bag: Modeling of Na airglow emissions and first results of nocturnal variation at a mid-latitude, *JpGU-AGU Joint Meeting*, Tokyo, Japan, 19-25 May, 2017.
22. G Bharti, MV Sunil Krishna: Radiative cooling of Nitric Oxide emission observed by TIMED/SABER over asian sector during severe geomagnetic storms, *JpGU-AGU Joint Meeting*, Tokyo, Japan, 19-25 July, 2017.
23. Sunil Krishna MV, Gaurav Bharti.: Influence of solar proton events on the infrared radiative cooling by Nitric Oxide, *The 14<sup>th</sup> Quadrennial Solar Terrestrial Physics Symposium*, York University, Canada, 9-13 July, 2018.
24. Gaurav Bharti, MV Sunil Krishna: The effect of space weather on sodium airglow emissions, *The 14<sup>th</sup> Quadrennial Solar Terrestrial Physics Symposium*, York University, Canada, 9-13 July, 2018.
25. Gaurav Bharti, MV Sunil Krishna: Effect of geomagnetic storm conditions on the equatorial ionization anomaly and equatorial temperature anomaly, *42<sup>nd</sup> COSPAR Scientific Assembly*, Caltech, Pasadena, USA, 14-22 July, 2018.
26. Sunil Krishna MV and Gaurav Bharti: Variation of radiative cooling and Nitric Oxide abundance during intense geomagnetic storms as observed by TIMED-SABER and GUVI, *42<sup>nd</sup> COSPAR Scientific Assembly*, Caltech, Pasadena, USA, 14-22 July, 2018.
27. Sunil Krishna MV, Gaurav Bharti: Thermospheric cooling during extreme space weather events, *20<sup>th</sup> National Space Science Symposium*, SP Pune University, 29-31 January, 2019.
28. Alok Ranjan, MV Sunil Krishna, Akash Kumar, Gaurav Bharti, S Sarkhel: Aspects related to variability of radiative cooling by NO in lower thermosphere, TEC and O/N<sub>2</sub> correlation and diffusion of NO into mesosphere during the Halloween storms, *44<sup>th</sup> COSPAR Scientific Assembly*, Athens, 2022.
29. Sunil Krishna MV, Alok Ranjan, Akash Kumar, S Sarkhel.: On the influence of major sudden stratospheric warming events on the mesospheric cooling by nitric oxide, ozone abundance and their interrelation, *44<sup>th</sup> COSPAR Scientific Assembly*, Athens, 2022.

## WORKSHOPS ATTENDED

1. *Workshop on Modeling of Planetary Atmospheres*, December 2006 - January 2007, Physical Research Laboratory, Ahmedabad.
2. *DST - SERC training program on Atmospheric and Space Sciences*, 8 - 28 September 2008, Department of Physics, Andhra University, Visakhapatnam.
3. *COSPAR Capacity Building Workshop on Lunar and Planetary Sciences*, 6 - 19 September 2009, Harbin Institute of Technology, Harbin, China.
4. *Princeton-Ashoka-Infosys winter school on AI/ML*, 12-24 December, 2022, Infosys Campus, Mysuru.

## ADMINISTRATIVE BACKGROUND

- ◇ Prof-in-charge, Time-table, Department of Physics, IIT Roorkee (2019-2022)
- ◇ Member, Advisory Committee, Institute Computer Center (2017-2020)
- ◇ Warden, Rajendra Bhawan, IIT Roorkee(2018-2020)
- ◇ O.C. Atmospheric Physics Lab, Department of Physics, IIT Roorkee (2014-16) (2022-)
- ◇ Faculty Advisor, Physics Association (2011-2012).
- ◇ Convener, Reports & Website Committee, Department of Physics, IIT Roorkee (2012-2016).
- ◇ Deputy O.C, Computer Lab, Department of Physics, IIT Roorkee (2012 - 2014).
- ◇ Deputy O.C, Atmospheric Physics Lab, Department of Physics, IIT Roorkee (2012-2014).
- ◇ Treasurer, Indian Physics Association, Roorkee Chapter.
- ◇ Faculty Advisor, COGNIZANCE - 2013, Department of Physics.
- ◇ Chief Warden, Rajendra Bhawan, IIT Roorkee (2020-2021)
- ◇ Chief Warden, Ganga Bhawan, IIT Roorkee (2020-2021)
- ◇ Member, Departmental Administrative Committee (2015-2017)(2021-2023)
- ◇ Member, Departmental Academic Program Committee (2017-2021)
- ◇ Member, Departmental Research Committee (2021-2023)
- ◇ Member, Departmental Faculty Search Committee (2021-2023)

## PERSONAL INFORMATION

Date of Birth : 27<sup>th</sup> March 1979

Gender : Male

Marital Status : Married

Nationality : Indian