

CURRICULUM VITAE

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EDUCATION

- 07.2010 - 07.2017 Ph.D. in Physics, Indian Institute of Astrophysics, Bangalore, India, thesis title ‘Scattering Polarization with Paschen–Back Effect as a tool to Diagnose the Magnetic Structuring of the Solar Atmosphere’, supervisor: Prof. K. N. Nagendra
- 07.2008 - 06.2010 M.Sc. in Physics with a specialization in Nuclear Physics, Bangalore University, Bangalore, India
- 07.2005 - 06.2008 B.Sc. with a specialization in Physics, Chemistry, and Mathematics, B.M.S. College for Women, Bangalore, India

RESEARCH APPOINTMENTS

- 01.2021 - present Post Doctoral Fellow, Max Planck Institute for Solar System Research, Göttingen, Germany
- 01.2019 - 12.2020 Marie-Sklodowska Curie Fellow, Max Planck Institute for Solar System Research, Göttingen, Germany
- 06.2017 - 12.2018 Post Doctoral Fellow, Max Planck Institute for Solar System Research, Göttingen, Germany
- 01.2017 - 05.2017 Post Doctoral Fellow, Udaipur Solar Observatory, Udaipur, India
- 04.2016 - 12.2016 Post Doctoral Researcher, Indian Institute of Astrophysics, Bangalore, India
- 07.2010 - 03.2016 Doctoral Student, Indian Institute of Astrophysics, Bangalore, India

AWARDS AND MERITS

- 02.2018 Marie-Sklodowska Curie Fellowship
- 09.2016 Foreign travel grant by the Human Resource Development Group, Council of Scientific & Industrial Research, India, to participate in the conference Solar Polarization 8 Workshop held in Florence, Italy, 12–16 September, 2016
- 05.2014 International travel support by the Department of Science & Technology, India, to participate in the conference Theory & Modeling of Polarization in Astrophysics held in Prague, Czech Republic, 5–8 May, 2014
- 11.2013 Indo-Swiss research scholarship to visit Istituto Ricerche Solari Locarno, Switzerland
- 12.2010 Qualification for lectureship through National Eligibility Test conducted by the Council of Scientific & Industrial Research
- 06.2010 Six gold medals in M.Sc. for securing first rank in state level examination of Bangalore University (first among about 200 students)
- 07.2009 Successfully completed the Research Education Advancement Programme, a three year course conducted by the Jawaharlal Nehru Planetarium, Bangalore, India
- 05.2008 Sixth rank in the state level B.Sc. examination of Bangalore University (sixth among about 10,000 students)
- 02.2007 Second place in Bangalore Zonal Level Science Exhibition organized by the Karnataka Science & Technology Academy

SCIENTIFIC INTERESTS

- Solar irradiance variability in the ultraviolet domain
- Stellar magnetic activity influence on astrometric detection of exoplanets
- Spectral line formation and radiative transfer

CONFERENCES

Contributed talks:

- ‘Solar irradiance variability in the near-UV Ca II H & K lines’ at the Space Climate Symposium held at Krakow, Poland, 19–22 September 2022
- ‘Inclination and metallicity dependence of the near-UV Ca II H & K emissions’ at the Sun Climate Symposium held in Madison, Wisconsin, 16–20 May 2022
- ‘Modelling stellar S-index’ at the ISSI team 446 meeting, Bern, Switzerland, 25–29 April 2022
- ‘Solar irradiance variability in the chromospheric UV lines’ at the virtual Solar Terrestrial Physics-15 Symposium, 21–25 February 2022
- ‘Modeling solar Ca II H & K emission variations’ at the virtual 16th European Solar Physics Meeting, 6–10 September 2021
- ‘Modeling the Ca II H & K emission variations - effect of inclination on the S-index’ at the Virtual Annual Meeting of the German Astronomical Society, 21–25 September 2020
- ‘Chromosphere above sunspot umbra’ at IRIS-10 workshop held in Bengaluru, India, 4–8 November, 2019
- ‘Magnetized chromospheric downflows’ at the Solar Polarization Workshop 9, Göttingen, Germany, 26–30 August 2019
- ‘Magnetized chromospheric downflows’ at the GREGOR meeting 2018, Staufen, Germany, 13–14 December 2018 (talk presented by Juan Sebastian Castellanos Duran)
- Thesis presentation on ‘Scattering polarization with Paschen–Back effect as a tool to diagnose the magnetic structuring of the solar atmosphere’ at the 36th annual meeting of the Astronomical Society of India, hosted by the Osmania University, Hyderabad, India, 5–9 February, 2018
- ‘He I 10830 Å downflows’ at GREGOR Science and Technical Development meeting, Potsdam, Germany, 27–28 November, 2017
- ‘Partial frequency redistribution theory with Paschen–Back effect: application to Li I 6708 Å lines’ at the Solar Polarization 8 Workshop held in Florence, Italy, 12–16 September, 2016
- ‘Influence of Paschen–Back effect on the atomic spectral line polarization’ in the 33rd annual meeting of the Astronomical Society of India, hosted by the National Centre for Radio Astrophysics of the Tata Institute of Fundamental Research, Pune, India, 17–20 February, 2015
- ‘Paschen–Back effect in hyperfine structure states of an atom including the effects of partial frequency redistribution’ in the WG2 meeting of the COST Action MP1104 on the Theory & Modeling of Polarization in Astrophysics held in Prague, Czech Republic, 5–8 May, 2014

Posters:

- ‘Metallicity dependence of stellar Ca II H & K emissions’ at the Cool Stars 21 meeting held at Toulouse, France, 4–9 July 2022
- ‘Modeling Solar Ca II H & K emission variations’ at the Cool Stars 20.5 Virtual Meeting, 2–4 March 2021
- ‘Inclination Dependence of Solar Ca II H & K Emission’ at the IIA-50 meeting, Advances in Observations and Modelling of Solar Magnetism and Variability, 1–4 March 2021
- ‘Magnetized chromospheric supersonic downflows’ at IAUS 354, Solar and stellar magnetic fields: origins and manifestations held in Copiapo, Chile, 30 June–6 July 2019
- ‘Fast downflows in the chromosphere seen by He I 1083 nm lines’ at IRIS-9 workshop held in Göttingen, Germany, 25–29 June, 2018
- ‘Downflows in the chromosphere seen by He I 1083 nm lines at IAUS 340: Long-term datasets for the understanding of solar and stellar magnetic cycles held in Jaipur, India, 19–23 February, 2018
- ‘Scattering theory of Paschen–Back effect: application to Li I 6708 Å doublet’ at The many Scales of the Universe: Galaxies, their Suns, and their Planets; annual meeting of the Astronomische Gesellschaft held in Göttingen, Germany, 18–22 September, 2017
- ‘Paschen–Back effect involving atomic fine and hyperfine structure states’ at Polarimetry: from the Sun to stars and stellar environments, IAU symposium 305–Punta Leona, Costa Rica, November 30–December 5, 2014
- ‘Intrinsically polarized blend lines’ at the 7th Solar Polarization Workshop (SPW7), held at Kunming, China, 9–13 September, 2013

Attended:

- High Precision Solar Polarimetry Workshop, held at Locarno, Switzerland, 14–15 October 2022
- WholeSun meeting held at Pascal Institute, Paris, France, 21–25 March 2022
- BCool meeting 2021, held online, 12–14 April, 2021
- SAMI18: Meeting about Solar Activity, Magnetism and Irradiance, held at the Max Planck Institute for Solar System Research, Göttingen, Germany, 16–18 October, 2018
- WoCaNet Symposium 2017 held at the Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, 12–13 October, 2017
- Rocks & Stars II conference, held at the Max Planck Institute for Solar System Research, Göttingen, Germany, 13–16 September, 2017
- Workshop on ‘The magnetic universe’ held by the Astronomical Society of India at the Inter University Centre for Astronomy and Astrophysics, Pune, India, 16 February 2015
- Indo-German Workshop on Solar Astronomy, held at the Indian Institute of Astrophysics, Bangalore, India, 17–18 November, 2014

INVITED SEMINARS

- ‘Paschen–Back effect in atomic states as a tool for magnetic field diagnostics’ at the Max Planck Institute for Solar System Research, Göttingen, Germany, 29 June, 2017
- ‘Scattering polarization with Paschen–Back effect as a tool to diagnose the magnetic structuring of the solar atmosphere’ at Pondicherry University, Pondicherry, India, 05 April, 2017
- ‘Paschen–Back effect in atomic states as a tool for magnetic field diagnostics’ at the Udaipur Solar Observatory, Rajasthan, India, 01 February, 2017
- ‘*F*-state interference in the Paschen–Back regime’ at Physikalisch-Meteorologisches Observatorium Davos, World Radiation Center, Switzerland, 23 December, 2013

MEMBERSHIP IN SCIENTIFIC SOCIETIES

06.2020 - present Junior member of the International Astronomical Union
07.2013 - present Member of the Astronomical Society of India

PUBLIC OUTREACH

- An outreach event on partial solar eclipse on 25 October 2022 at the Max Planck Institute for Solar System Research, Göttingen, Germany
- Nacht des Wissens (night of science) 2022, a public outreach program at the Max Planck Institute for Solar System Research, Göttingen, Germany
- An online lecture as part of the one day workshop for high school female students organized by the Jawaharlal Nehru Planetarium, Bengaluru, India
- Let’s talk astronomy May–June 2020, an online astronomy outreach activity for school and college students across India amid COVID-19 crisis
- Nacht des Wissens (night of science) 2019, a public outreach program at the Max Planck Institute for Solar System Research, Göttingen, Germany
- Astronomy outreach program for high school children at several private and government schools in Bangalore and Udaipur, India
- A poster on ‘women in science’ for the public outreach as a part of National Science Day celebrations at the Udaipur Solar Observatory, Rajasthan, India
- A poster on ‘space weather and Sun–Earth connections’ for the Evershed museum at the Kodaikanal Solar Observatory, Tamil Nadu, India
- Outreach programs at the Indian Institute of Astrophysics, the Jawaharlal Nehru Planetarium and the Udaipur Solar Observatory, India

TEACHING AND SUPERVISION

- Co-supervisor for two internship students at the Max Planck Institute for Solar System Research, Göttingen, Germany
- Taught Physics and mentored college students at a non-government organization called PRERANA, Bangalore, India

PROFESSIONAL RESPONSIBILITIES

- A member of the local organizing committee, Solar Polarization Workshop 9, Göttingen, Germany, 26–30 August 2019
- Postdoc representative at the Max Planck Institute for Solar System Research, Göttingen, Germany

PUBLICATIONS

A. In peer reviewed international journals

- Nemec, N.-E., Shapiro, A. I., Isik, E., **Sowmya, K.**, Solanki, S. K., Krivova, N. A., Cameron, R. H., Gizon, L.: *Faculae Cancel out on the Surfaces of Active Suns*, 2022, ApJL, 934, 23
- **Sowmya, K.**, Nemec, N.-E., Shapiro, A. I., Isik, E., Krivova, N. A., Solanki, S. K.: *Predictions of Astrometric Jitter for Sun-Like Stars. III. Fast Rotators*, 2022, ApJ, 934, 146
- Kaplan-Lipkin, A., Macintosh, B., Madurowicz, A., **Sowmya, K.**, Shapiro, A. I., Krivova, N. A., Solanki, S. K.: *Multiwavelength Mitigation of Stellar Activity in Astrometric Planet Detection*, 2022, AJ, 163, 205
- **Sowmya, K.**, Lagg, A., Solanki, S. K., Castellanos Duran, J. S.: *Magnetized Supersonic Downflows in the Chromosphere. A Statistical Study Using the He I 10830 Å Lines*, 2022, A&A, 661, 122
- **Sowmya, K.**, Nèmec, N.-E., Shapiro, A. I., Işık, E., Witzke, V., Mints, A., Krivova, N. A., Solanki, S. K.: *Prediction of Astrometric Jitter for Sun-Like Stars. II. Dependence on Inclination, Metallicity and Active-Region Nesting*, 2021, ApJ, 919, 94
- **Sowmya, K.**, Shapiro, A. I., Witzke, V., Nèmec, N.-E., Chatzistergos, T., Yeo, K. L., Krivova, N. A., Solanki, S. K.: *Modeling Stellar Ca II H and K Emission Variations. I. Effect of Inclination on the S-index*, 2021, ApJ, 914, 21
- Nagendra, K. N., **Sowmya, K.**, Sampoorana, M., Stenflo, J. O., Anusha, L. S.: *Importance of Angle-dependent Partial Frequency Redistribution in Hyperfine Structure Transitions Under the Incomplete Paschen–Back Effect Regime*, 2020 ApJ, 898, 49
- Zhang, J., Shapiro, A. I., Bi, S., Xiang, M., Reinhold, T., **Sowmya, K.**, Li, Y., Li, T., Yu, J., Du, M., Zhang, X.: *Solar-type Stars Observed by LAMOST & Kepler*, 2020, ApJL, 894, 11
- Sampoorana, M., Nagendra, K. N., **Sowmya, K.**, Stenflo, J. O., Anusha, L. S.: *Polarized Line Formation in Arbitrary Strength Magnetic Fields: The Case of a Two-level Atom with Hyperfine Structure Splitting*, 2019, ApJ, 883, 188
- **Sowmya, K.**, Nagendra, K. N., Sampoorana, M., Stenflo, J. O.: *Polarized Scattering of Light for Arbitrary Magnetic Fields with Level-Crossings from the Combination of Hyperfine and Fine Structure Splittings*, 2015, ApJ, 814, 127
- **Sowmya, K.**, Nagendra, K. N., Sampoorana, M., Stenflo, J. O.: *Polarized Light Scattering with the Paschen–Back Effect, Level-Crossing of Fine Structure States, and Partial Frequency Redistribution*, 2014, ApJ, 793, 71
- **Sowmya, K.**, Nagendra, K. N., Stenflo, J. O., Sampoorana, M.: *Polarized Scattering with Paschen–Back Effect, Hyperfine Structure, and Partial Frequency Redistribution in Magnetized Stellar Atmospheres*, 2014, ApJ, 786, 150
- Smitha, H. N., **Sowmya, K.**, Nagendra, K. N., Sampoorana, M., Stenflo, J. O.: *Polarized Line Transfer with F-State Interference in a Non-Magnetic Medium: Partial Frequency Redistribution Effects in the Collisionless Regime*, 2012, ApJ, 758, 112

- **Sowmya, K.**, Nagendra, K. N., Sampoorna, M.: *Blend Lines in the Polarized Spectrum of the Sun*, 2012, MNRAS, 423, 2949

B. In refereed conference proceedings

- **Sowmya, K.**, Lagg, A., Solanki, S. K., Castellanos Dúran, J. S.: *Fast Downflows in a Chromospheric Filament*, 2020, in IAU 354 proceedings, 354, 454
- Sampoorna, M., Nagendra, K. N., **Sowmya, K.**, Stenflo, J. O., Anusha, L. S.: *Polarized Line Formation with Incomplete Paschen–Back Effect and Partial Frequency Redistribution*, 2019, in ASP Conference Series, Radiative Signatures from the Cosmos, 519, 113
- Nagendra, K. N., **Sowmya, K.**, Sampoorna, M., Stenflo, J. O., Anusha, L. S.: *Polarized Line Transfer in the Incomplete Paschen–Back Effect Regime with Angle-Dependent Partial Frequency Redistribution*, 2019, in proceedings of Solar Polarization 9, 19
- **Sowmya, K.**, Nagendra, K. N., Sampoorna, M., Stenflo, J. O.: *Partial Frequency Redistribution Theory with Paschen–Back Effect: Application to LiI 6708 Å Lines*, 2017, in ASP Conference Series, Solar Polarization 8, 526, 43
- **Sowmya, K.**, Nagendra, K. N., Sampoorna, M., Stenflo, J. O.: *Paschen–Back Effect Involving Atomic Fine and Hyperfine Structure States*, 2015, in the Proceedings of the IAU Symposium No. 305, Polarimetry: From the Sun to Stars and Stellar Environments, ed. K. N. Nagendra et al., 154
- **Sowmya, K.**, Nagendra, K. N., Sampoorna, M.: *Intrinsically Polarized Blend Lines*, 2014, in ASP Conference Series Volume 489, Solar Polarization 7, ed. K. N. Nagendra et al. (San Francisco, CA:ASP), 125