

Anshu Kumari
Space Physics Research Group



Employment

Space Physics Research Group
University of Helsinki
University of Helsinki, Unknown
1 Feb 2020 → present

Curriculum vitae

Current Position

Postdoctoral Researcher at Space Physics Group, University of Helsinki, Finland (01/02/2020 - present)

Previous Work Experience

Postdoctoral Researcher at Indian Institute of Astrophysics, India (19/12/2019 - 29/01/2020)

Projects

RadioCME (Determining the space weather impact of coronal mass ejections using radio observations) project funded by the University of Helsinki (as a Postdoctoral fellow at University of Helsinki, 01/02/2022 - present)

SoIMAG (Unraveling the structure solar flux ropes and their magnetosheath) ERC Consolidator Grant project (2017 -2022) led by Prof. Emilia Kilpua, University of Helsinki (as a Post-Doc fellow at University of Helsinki, 01/02/2020 - 31/01/2022)

FOREsail (Finnish Centre of Excellence in Research of Sustainable Space) funded by the Academy of Finland (as Post-Doc fellow at University of Helsinki, 02/2018 - present)

Technical Skills

Programming: MATLAB, C/C++, Python & Shell Scripting

Electronics: 4Nec2 Antenna Design Software, Xilinx Tool Suite, Simulink & LabView

Data Analysis: AIPS, CASA, IDL-solarsoft, Origin

Simulations: MPI-AMRVAC, CORMA, ELECTRICIT

Data Visualisation: ParaView, VisIT

Instruments: Vector Network Analysers, Spectrum Analysers & Mixed Signal Oscilloscopes

Research Experience

University of Helsinki, Finland Feb 2020 - present

- Running and writing simulation codes for data driven time-dependent magneto-frictional modelling of flux ropes.
- Long term statistical studies of solar radio bursts.
- Teaching assistance to Solar Physics Course for University students (Undergrad, Masters and Ph.D.)

- Mentored (co-supervised) two masters students for their masters thesis.

Indian Institute of Astrophysics - Gauribidanur Radio Astronomy Field Station, India Sep 2014 - Jan 2020

- Gauribidanur RAdio HeliograPH (GRAPH) data reduction pipeline for 2D imaging of the solar corona in CASA.
- Development of a ROACH based high spectral & temporal resolution spectro-polarimeter for observations of solar transients.

The Netherlands Institute for Radio Astronomy, ASTRON, The Netherlands Jun 2018 - Aug 2018

- Data reduction pipeline for high resolution LOFAR interferometric solar data & Interferometric & tied array beam data analysis for Type III bursts and Coronal holes.

University of Mekele, Ethiopia May 2018

- Multi wavelength analysis of type II bursts using space and ground based observations.

Awards & Achievements

- ASI Justice Oak thesis award 2021 Honourable Mention during Astronomical Society of India Meeting, 2022.
- Young Scientist Award 2021 by Madhawi-Shyam Educational Trust.
- K. D. Abhyankar Best presentation of thesis 2021 during Astronomical Society of India Meeting.
- Awarded visiting scholar grant at Royal Observatory of Belgium, Belgium in 2020 (postponed due to COVID-19).
- SCOSTEP travel grant award to attend COSPAR KSO Workshop at KodaiKanal Solar Observatory, India in 2020.
- Invited seminar at Indian Institute of Astrophysics, India - 2018 at IIA, Bangalore.
- Awarded Summer Fellowship at ASTRON, the Netherlands in 2018.
- SCOSTEP travel grant award to attend COSPAR Capacity building workshop at Mekele, Ethiopia in 2018.
- Invited talk at Neighborhood Astronomy Meeting (NAM) - 2018 at IIA, Bangalore.
- Awarded Radionet travel grants to attend CESRA - 2018.
- Awarded 32 hours of observation with the uGMRT.
- Best Poster award in Astronomical Instrumentation at ASI - 2016.
- Best Poster award in Instrumentation category at URSI-RCRS - 2015.
- Qualified GATE-2013 (National eligibility exam for Engineers in India) with 98.83 percentile.
- University 7th rank holder of 2008 - 2012 batch in Electronics & Communication.

Publications

The effect of data-driving and relaxation models on magnetic flux rope evolution and stability

Wagner, A., Price, D., Bourgeois, S., Daei, F., Pomoell, J., Poedts, S., Kumari, A., Barata, T., Erdélyi, R. & Kilpua, E., 2 Dec 2024, In: *Astronomy & Astrophysics*. 692, 11 p., A74.

Connecting remote and in situ observations of shock-accelerated electrons associated with a coronal mass ejection

Morosan, D. E., Pomoell, J., Palmroos, C., Dresing, N., Asvestari, E., Vainio, R., Kilpua, E. K. J., Gieseler, J., Kumari, A. & Jebaraj, I. C., 1 Mar 2024, In: *Astronomy and Astrophysics*. 683, 16 p., A31.

Spatially resolved radio signatures of electron beams in a coronal shock

Zhang, P., Morosan, D., Kumari, A. & Kilpua, E., 1 Mar 2024, In: *Astronomy and Astrophysics*. 683, 12 p., A123.

The automatic identification and tracking of coronal flux ropes: I. Footpoints and fluxes

Wagner, A., Kilpua, E. K. J., Sarkar, R., Price, D. J., Kumari, A., Daei, F., Pomoell, J. & Poedts, S., Sept 2023, In: *Astronomy & Astrophysics*. 677, 12 p., A81.

Modeling the formation and eruption of coronal structures by linking data-driven magnetofrictional and MHD simulations for AR 12673

Daei, F., Pomoell, J., Price, D. J., Kumari, A., Good, S. & Kilpua, E. K. J., Aug 2023, In: *Astronomy & Astrophysics*. 676, 12 p., A141.

Type II radio bursts and their association with coronal mass ejections in solar cycles 23 and 24

Kumari, A., Morosan, D. E., Kilpua, E. K. J. & Daei, F., 6 Jul 2023, In: *Astronomy & Astrophysics*. 675, 11 p., A102.

A type II solar radio burst without a coronal mass ejection

Morosan, D. E., Pomoell, J., Kumari, A., Kilpua, E. K. J. & Vainio, R., 4 Jul 2023, In: Astronomy & Astrophysics. 675, 10 p., A98.

Effects of optimisation parameters on data-driven magnetofrictional modelling of active regions

Kumari, A., Price, D. J., Daei, F., Pomoell, J. & Kilpua, E. K. J., Jul 2023, In: Astronomy & Astrophysics. 675, 12 p., A80.

Solar Coronal Density Turbulence and Magnetic Field Strength at the Source Regions of Two Successive Metric Type II Radio Bursts

Ramesh, R., Kathiravan, C. & Kumari, A., 20 Jan 2023, In: The Astrophysical journal. 943, 43, 6 p., 43.

Shock-accelerated electrons during the fast expansion of a coronal mass ejection

Morosan, D. E., Pomoell, J., Kumari, A., Vainio, R. & Kilpua, E. K. J., 1 Dec 2022, In: Astronomy and Astrophysics. 668, 13 p., A15.

Interferometric Imaging, and Beam-Formed Study of a Moving Type-IV Radio Burst with LOFAR

Liu, H., Zucca, P., Cho, K.-S., Kumari, A., Zhang, P., Magdalenic, J., Kim, R.-S., Kim, S. & Kang, J., 9 Sept 2022, In: Solar Physics. 297, 9, 15 p., 115.

Type IV Radio Bursts and Associated Active Regions in Sunspot Cycle 24

Kumari, A., 27 Jul 2022, In: Solar Physics. 297, 7, 11 p., 98.

Exploring the Circular Polarisation of Low-Frequency Solar Radio Bursts with LOFAR

Morosan, D. E., Räsänen, J. E., Kumari, A., Kilpua, E. K. J., Bisi, M. M., Dabrowski, B., Krankowski, A., Magdalenic, J., Mann, G., Rothkaehl, H., Vocks, C. & Zucca, P., 20 Apr 2022, In: Solar Physics. 297, 4, 17 p., 47.

Trends and characteristics of high-frequency type II bursts detected by CALLISTO spectrometers

Umuhire, A. C., Uwamahoro, J., Raja, K. S., Kumari, A. & Monstein, C., 15 Oct 2021, In: Advances in Space Research. 68, 8, p. 3464-3477 14 p.

New Results on the Direct Observations of Thermal Radio Emission from a Solar Coronal Mass Ejection

Ramesh, R., Kumari, A., Kathiravan, C., Ketaki, D. & Wang, T. J., 28 Apr 2021, In: Geophysical Research Letters. 48, 8, 9 p., ARTN e2020GL091048.

Imaging and Spectral Observations of a Type-II Radio Burst Revealing the Section of the CME-Driven Shock That Accelerates Electrons

Majumdar, S., Tadeballi, S. P., Maity, S. S., Deshpande, K., Kumari, A., Patel, R. & Gopalswamy, N., Apr 2021, In: Solar Physics. 296, 4, 16 p., 62.

Moving solar radio bursts and their association with coronal mass ejections

Morosan, D. E., Kumari, A., Kilpua, E. K. J. & Hamini, A., 25 Mar 2021, In: Astronomy & Astrophysics. 647, 5 p., 12.

Solar Radio Spectro-polarimetry (50-500 MHz) : Design and Development of Cross-Polarized Log-Periodic Dipole antenna and configuration of receiver system

Kumari, A., GVS, G., Kathiravan, C., V, M. & V Barve, I., 13 Jan 2021, (E-pub ahead of print) In: arXiv e-prints. p. 1 25 p.

On the occurrence of type IV solar radio bursts in the solar cycle 24 and their association with coronal mass ejections

Kumari, A., Morosan, D. & Kilpua, E., 11 Jan 2021, In: The Astrophysical journal. 906, 2, 9 p., 79.

Electron acceleration and radio emission following the early interaction of two coronal mass ejections

Morosan, D. E., Palmerio, E., Räsänen, J. E., Kilpua, E. K. J., Magdalenic, J., Lynch, B. J., Kumari, A., Pomoell, J. & Palmroth, M., 13 Oct 2020, In: Astronomy & Astrophysics. 642, 13 p., 151.

Low-Frequency Radio Observations of the "Quiet" Corona During the Descending Phase of Sunspot Cycle 24

Ramesh, R., Kumari, A., Kathiravan, C., Ketaki, D., Rajesh, M. & Vrunda, M., 28 Sept 2020, In: Geophysical Research Letters. 47, 18, 8 p., ARTN e2020GL090426.

Direct Estimates of the Solar Coronal Magnetic Field Using Contemporaneous Extreme-ultraviolet, Radio, and White-light Observations

Kumari, A., Ramesh, R., Kathiravan, C., Wang, T. J. & Gopalswamy, N., 8 Aug 2019, In: The Astrophysical journal. 881, 1, p. 24 32 p.

On the usefulness of existing solar wind models for pulsar timing corrections

Tiburz, C., Verbiest, J. P. W., Shaifullah, G. M., Janssen, G. H., Anderson, J. M., Horneffer, A., K'unsem'oller, J., Osłowski, S., Donner, J. Y., Kramer, M., Kumari, A., Porayko, N. K., Zucca, P., Ciardi, B., Dettmar, R.-J., Griesmeier, J.-M., Hoefl, M. & Serylak, M., Jul 2019, In: Monthly notices of the Royal Astronomical Society: Letters. 487, 1, p. 394 408 p.

The First Low-frequency Radio Observations of the Solar Corona on ≈ 200 km Long Interferometer Baseline

Mugundhan, V., Ramesh, R., Kathiravan, C., Gireesh, G., Kumari, A., Hariharan, K. & Indrajit, V., 1 Mar 2018, In: Astrophysical Journal Letters. 855, L8, p. 1 4 p.

Addendum to: Strength of the Solar Coronal Magnetic field - A Comparison of Independent Estimates Using Contemporaneous Radio and Whitelight Observations

Kumari, A., Ramesh, R., Kathiravan, C. & Wang, J.-T., Dec 2017, In: Solar Physics. 292, 12, p. 177

Strength of the Solar Coronal Magnetic field - A Comparison of Independent Estimates Using Contemporaneous Radio and Whitelight Observations

Kumari, A., Ramesh, R., Kathiravan, C. & Wang, J.-T., Nov 2017, In: Solar Physics. 292, 11, p. 161

New Evidence for a Coronal Mass Ejection-driven High Frequency Type II Burst near the Sun

Kumari, A., Ramesh, R., Kathiravan, C. & Gopalswamy, N., Jul 2017, In: The Astrophysical journal. 843, 1, p. 10

Activities

Solar Radio Spectro-polarimetry (50 - 500 MHz)

Kumari, A. (Speaker)

3 Dec 2022

Source Sizes of Fine Structures in Type II Radio Bursts with LOFAR Interferometric Observations

Kumari, A. (Speaker)

3 Dec 2022

URSI Regional Conference on Radio Science

Kumari, A. (Speaker: Presenter)

1 Dec 2022 → 4 Dec 2022

Aditya-L1 Support Cell Second Workshop 2022

Kumari, A. (Speaker: Presenter)

28 Nov 2022 → 30 Nov 2022

Introduction to Flare data analysis in UV and Radio wavelengths

Kumari, A. (Speaker)

28 Nov 2022

International Centre for Theoretical Sciences (ICTS)

Kumari, A. (Visiting researcher)

24 Nov 2022

Giant Metrewave Radio Telescope (GMRT)-NCRA

Kumari, A. (Visiting researcher)
16 Nov 2022 → ...

National Centre for Radio Astrophysics - Tata Institute of Fundamental Research (TIFR-NCRA), Pune

Kumari, A. (Visiting researcher)
14 Nov 2022 → 17 Nov 2022

Inter-University Centre for Astronomy and Astrophysics

Kumari, A. (Visiting researcher)
10 Nov 2022 → 11 Nov 2022

Indian Institute of Science Education & Research (IISER) - Pune

Kumari, A. (Visiting researcher)
7 Nov 2022 → 9 Nov 2022

Indian Institute of Science (IISc) - Bangalore

Kumari, A. (Visiting researcher)
4 Nov 2022

Raman Research Institute (RRI), Bangalore

Kumari, A. (Visiting researcher)
3 Nov 2022

European Space Weather Week 2022

Kumari, A. (Poster Presentation)
24 Oct 2022 → 28 Oct 2022

On the source sizes of fine structures of type II radio bursts using LOFAR

Kumari, A. (Speaker)
27 Sept 2022

PLANETARY, SOLAR, AND HELIOSPHERIC RADIO EMISSIONS

Kumari, A. (Speaker: Presenter)
26 Sept 2022 → 28 Sept 2022

Solar Physics High Energy Research (SPHERE) Workshop

Kumari, A. (Attendee)
11 Jul 2022 → 15 Jul 2022

Pencil Code User Meeting 2022

Kumari, A. (Attendee)
4 May 2022 → 10 May 2022

Space Weather Workshop 2022

Kumari, A. (Poster Presentation)
26 Apr 2022 → 28 Apr 2022

Indian Women in Space

Kumari, A. (Speaker: Presenter)
9 Apr 2022

Effects of optimisation parameters on data-driven magnetofrictional modelling

Kumari, A. (Speaker)

26 Mar 2022

40th Annual Meeting of the Astronomical Society of India

Kumari, A. (Attendee)

25 Mar 2022 → 29 Mar 2022

Planetary Space Weather Workshop

Kumari, A. (Speaker)

25 Mar 2022

Physics Days 2022

Kumari, A. (Poster Presentation)

3 Mar 2022

Solar Radio Spectro-Polarimetry (50 - 500 MHz): Design and Development of Cross-Polarized Log-Periodic Dipole Antenna and Configuration of Receiver System

Kumari, A. (Speaker)

23 Feb 2022

Second ESCAPE Virtual Observatory school

Kumari, A. (Attendee)

22 Feb 2022 → 24 Feb 2022

Solar and Space Physics Decadal Survey White Papers Workshop #2:

Kumari, A. (Attendee)

22 Feb 2022 → 23 Feb 2022

FinCOSPAR 2022

Kumari, A. (Attendee)

17 Feb 2022 → 18 Feb 2022

Type II radio bursts and their association with coronal mass ejections

Kumari, A. (Speaker)

17 Feb 2022

SPACE RADIATION WORKSHOP

Kumari, A. (Attendee)

24 Jan 2022 → 28 Jan 2022

First Indian Space Weather Conference (ISWC-2022)

Kumari, A. (Attendee)

11 Jan 2022 → 12 Jan 2022

Type II radio bursts and their association with coronal mass ejections

Kumari, A. (Speaker)

11 Jan 2022

Advances in Space Research (Journal)

Kumari, A. (Reviewer)

2022 → ...

Astrophysics and Space Science (Journal)

Kumari, A. (Reviewer)

2022 → ...

Physica Scripta (Journal)

Kumari, A. (Reviewer)
2022 → 2023

Remote Sensing (Journal)

Kumari, A. (Reviewer)
2022 → ...

Universe (Journal)

Kumari, A. (Reviewer)
2022 → ...

FASR 2021

Kumari, A. (Attendee)
1 Dec 2021 → 3 Dec 2021

The Multiview Observatory for Solar Terrestrial Science (MOST) Virtual Science Meeting

Kumari, A. (Attendee)
17 Nov 2021 → 18 Nov 2021

ALMA-SOL-IMG Workshop 2

Kumari, A. (Attendee)
3 Nov 2021 → 5 Nov 2021

Baltic Applied Astrominformatics and Space data Processing

Kumari, A. (Attendee)
23 Sept 2021 → 24 Sept 2021

Online Workshop on High Performance Computing for Astronomy and Astrophysics

Kumari, A. (Attendee)
20 Sept 2021 → 23 Sept 2021

Online Radio Heliophysics Catch-up Meeting

Kumari, A. (Attendee)
10 May 2021 → 13 May 2021

Heliophysics 2050

Kumari, A. (Attendee)
3 May 2021 → 7 May 2021

Effects of optimisation parameters on data-driven magnetofrictional modelling

Kumari, A. (Speaker)
26 Apr 2021

Space Weather Workshop 2021

Kumari, A. (Attendee)
20 Apr 2021 → 22 Apr 2021

EGU General Assembly 2021

Kumari, A. (Speaker: Presenter)
19 Apr 2021 → 30 Apr 2021

Sub-second structures in low frequency solar radio observations

Kumari, A. (Attendee)

30 Mar 2021 → 1 Apr 2021

Physics Days 2021

Kumari, A. (Poster Presentation)

24 Mar 2021 → 26 Mar 2021

6th LOFAR Data School

Kumari, A. (Attendee)

22 Mar 2021 → 26 Mar 2021

Association of type IV radio bursts with CMEs in solar cycle 24

Kumari, A. (Speaker)

3 Mar 2021

IIA-50 Conference "Advances in Observations and Modelling of Solar Magnetism and Variability"

Kumari, A. (Speaker: Chair)

2 Mar 2021

IIA-50 Conference "Advances in Observations and Modelling of Solar Magnetism and Variability"

Kumari, A. (Speaker: Presenter)

1 Mar 2021 → 4 Mar 2021

ISWAT Virtual Meeting Series - G2A Cluster

Kumari, A. (Attendee)

23 Feb 2021 → 26 Feb 2021

Radio Polarimetric Imaging of the Solar Corona at Low Frequencies

Kumari, A. (Speaker)

21 Feb 2021

Multi-payload and Multi-Observatory Science with Aditya-L1

Kumari, A. (Attendee)

19 Feb 2021

39th Annual Meeting of the Astronomical Society of India (ASI)

Kumari, A. (Speaker: Presenter)

18 Feb 2021 → 23 Feb 2021

SKA in India: Preparing for building the SKA

Kumari, A. (Attendee)

17 Feb 2021 → 18 Feb 2021

The SDO 2021 Science Virtual Workshop

Kumari, A. (Attendee)

12 Feb 2021 → 30 Jun 2021

Second AI and Data Science and Earth and Space Science Workshop

Kumari, A. (Attendee)

9 Feb 2021 → 11 Feb 2021

ISU Adelaide Conference 2021

Kumari, A. (Attendee)
6 Feb 2021 → 7 Feb 2021

On the association of type IV radio bursts with CMEs in solar cycle 24

Kumari, A. (Speaker)
1 Feb 2021

43rd COSPAR Scientific Assembly

Kumari, A. (Speaker: Presenter)
28 Jan 2021 → 4 Feb 2021

European Space Week 2020

Kumari, A. (Attendee)
7 Dec 2020 → 11 Dec 2020

Space Physics seminar

Kumari, A. (Speaker)
3 Dec 2020

Science at Low Frequencies VII

Singh, A. (Attendee)
1 Dec 2020 → 4 Dec 2020

CASA VLBI Workshop

Singh, A. (Attendee)
2 Nov 2020 → 6 Nov 2020

European Space Weather Symposium 2020

Singh, A. (Poster Presentation)
2 Nov 2020 → 6 Nov 2020

IIA Science Story Series

Singh, A. (Speaker: Presenter)
26 Sept 2020

Online Advanced Study Program on Helicities in Astrophysics and Beyond

Kumari, A. (Attendee)
1 Sept 2020 → 31 Dec 2020