

Vindya Vashishth, SRF

Department of Physics, Indian Institute of Technology (BHU), Varanasi

✉ vindyavashishth.rs.phy19@iitbhu.ac.in

✉ vindya.vashishth@gmail.com



Education

- July 2019 – Present **Ph.D., Indian Institute of Technology (BHU), Varanasi** in Solar and Stellar Physics
Thesis Title: *Understanding the variabilities of magnetic cycles of Sun-like stars through dynamo modelling.*
- August 2016 – June 2018 **M.Sc., Gautam Buddha University** in Applied Physics
- August 2013 – June 2016 **B.Sc. (H), Gragi College, University Of Delhi** in Physics and Astrophysics

Technical Skills

- Coding **Fortran, C, C++, MATLAB, Scilab, Java, Python, IDL, GNU plot, MySQL**
- Advanced Code **Surya (solves 2D kinematic dynamo problem) and Pencil Code (for compressible magnetohydrodynamic flows)**
- Data Analysis **Origin, Python, IDL, MATLAB**
- Operating System **Microsoft Windows, Linux**
- Typesetting **L^AT_EX, MS word, LibreOffice**
- Languages **Strong reading, writing, and speaking competencies in English and Hindi.**

Organizational Skills

- Organized and facilitated a successful academic workshop, "3rd Aditya-L1 Workshop" at IIT (BHU) from 25th – 27th February 2023.
- Organized the "Departmental Annual Retreat 2023" held on 7th January 2023 with 150 attendees.
- Been Chief Coordinator of C. V. Raman Club of Science, Technology, and Innovation of Department of Applied Physics, Gautam Buddha University.
- Contributed and facilitated as coordinator in the SCIENCE DAY-2018 held at Gautam Buddha University.

Awards and Achievements

- Received the IAU grant of 3000€ for attending IAUGA-2022.
- Awarded DST-INSPIRE fellowship.
- Qualified national level exams naming, CSIR NET and GATE in 2019.
- University Topper at Gautam Buddha University in 2018.

Research Interests

Mean-Field Dynamo theory and its applications to the Sun and other Sun-like stars, turbulence, convection, magnetic field morphology, solar and stellar cycle, large-scale flows such as differential rotation and meridional circulation in the solar and stellar convection zone, stellar cycle variability and grand-minima occurrence in sun-like stars.

Research Publications

- 1 **Vashishth, V.**, Karak, B. B., & Kitchatinov, L. (2023). Dynamo modelling for cycle variability and occurrence of grand minima in Sun-like stars: rotation rate dependence. *Monthly Notices of the Royal Astronomical Society*, 522(2), 2601–2610. [doi:10.1093/mnras/stad1105](https://doi.org/10.1093/mnras/stad1105). arXiv: 2304.05819 [astro-ph.SR]
- 2 **Vashishth, V.** (2022). Modelling the occurrence of grand minima in sun-like stars using a dynamo model. *arXiv e-prints*, arXiv:2212.01795. [doi:10.48550/arXiv.2212.01795](https://doi.org/10.48550/arXiv.2212.01795). arXiv: 2212.01795 [astro-ph.SR]
- 3 **Vashishth, V.**, Karak, B. B., & Kitchatinov, L. (2021). Subcritical dynamo and hysteresis in a Babcock-Leighton type kinematic dynamo model. *Research in Astronomy and Astrophysics*, 21(10), 266. [doi:10.1088/1674-4527/21/10/266](https://doi.org/10.1088/1674-4527/21/10/266). arXiv: 2107.01546 [astro-ph.SR]
- 4 Kumar, P., Karak, B. B., & **Vashishth, V.** (2021). Supercriticality of the Dynamo Limits the Memory of the Polar Field to One Cycle. *The Astrophysical Journal*, 913(1), 65. [doi:10.3847/1538-4357/abf0a1](https://doi.org/10.3847/1538-4357/abf0a1). arXiv: 2103.11754 [astro-ph.SR]
- 5 Karak, B. B., Tomar, A., & **Vashishth, V.** (2020). Stellar dynamos with solar and antisolar differential rotations: Implications to magnetic cycles of slowly rotating stars. *Monthly Notices of the Royal Astronomical Society*, 491(3), 3155–3164. [doi:10.1093/mnras/stz3220](https://doi.org/10.1093/mnras/stz3220). arXiv: 1910.11893 [astro-ph.SR]

Project




March 2019 – July 2019

- **Ramanujan Fellowship sponsored project by Science & Engineering Research Board (SERB)**, under Dr. Bidya Binay Karak, Department of Physics, Indian Institute of Technology (BHU), Varanasi.
Project Title: *Stellar dynamos with solar and antisolar differential rotations*






Conferences

- 01–03 March 2023 ■ **Poster Presentation in the "41st Annual Meeting of the Astronomical Society of India (ASI)**", on "Hysteresis near dynamo transition of the large-scale dynamo in the presence of the small-scale dynamo".
- 21 February 2023 ■ **Talk in the "ISSI Team 474 online meeting"**, on "Changes of stellar cycle variability and frequency of grand minima with stellar rotation in dynamo models".
- 02–11 August 2022 ■ **Contributed talk in the "IAU General Assembly Focus Meeting 5"**, on "Modeling the occurrence of grand minima in sun-like stars using a dynamo model".
- 04–10 May 2022 ■ **Oral Presentation in the "Pencil Code user meeting 2022–18th Annual Meeting for Pencil Code Developers and Users"**, on "Hysteresis of the large-scale dynamo in presence of the small-scale dynamo".
- 25–29 March 2022 ■ **Poster Presentation in the "40th Annual Meeting of the Astronomical Society of India (ASI)**", on "Modelling the occurrence of grand minima in sun-like stars using a dynamo model".
- 21–25 February 2022 ■ **Attended "15th Quadrennial Solar-Terrestrial Physics Symposium (STP-15)"**
- 15 November 2021 ■ **Oral Presentation in "The 2nd International Symposium on Space Science (ISSS-21)"**, on "Sub-Critical Dynamos and Hysteresis in the Babcock-Leighton Type Kinematic Dynamo Models".

Conferences (continued)

- 06–10 September 2021  **Poster Presentation in the "16th European Solar Physics Meeting (ESPM-16)", on "Sub-Critical Dynamos and Hysteresis in the Babcock-Leighton Type Kinematic Dynamo Models".**
- 01–04 March 2021  **Poster Presentation in the International conference on "Advances in Observations and Modelling of Solar Magnetism and Variability", on "Sub-Critical Dynamos and Hysteresis in the Babcock-Leighton Type Kinematic Dynamo Models".**
- 18–23 February 2021  **Attended "39th Annual Meeting of the Astronomical Society of India (ASI)"**

Teaching Assistant at Department of Physics, IIT(BHU) Varanasi

-  Introduction to Engineering Electromagnetics (Course code: PHY102)
-  Classical Electrodynamics (Course code: PHY404)
-  Classical, Quantum, and Relativistic Mechanics (Course code: PHY101)
-  Classical Mechanics Laboratory (Course code: PHY101-Lab)
-  Optics Laboratory (Course code: PHY102-Lab)