

Amresh Verma

Curriculum Vitae

Department of Physics

Ariel University, Ariel, Israel

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Nationality : Indian

Date of Birth: 12 December 1998

Education

2023-Present **Ph.D. Physics**

Ariel University, Israel

Thesis title: *Phenomenological Aspects of Cosmology.*

Thesis Advisor: Dr. Ido Ben-Dayan

2020-2022 **M.Sc. Physics**

Jamia Millia Islamia, New Delhi, India

CGPA : 9.26/10, *First Division with Distinction.*

Master's thesis: *Study of Dark Matter-Dark Energy Interaction in the Light of Hubble Tension.*

Supervisor: Dr. Somasri Sen

2017-2020 **B.Sc.(Hons.) Physics**

West Bengal State University, Kolkata, India

Rank: *First Division*

Skills

Softwares Mathematica, Maxima

Programming Languages Python, C, Fortran

Operating system Linux, Windows

Languages Known English, Hindi, Bengali, Nepali

Publications

1. **Ben-Dayan I., Kumar U., Thattarampilly U., Verma A.,** *Probing The Early Universe Cosmology With NANOGrav: Possibilities and Limitations*, PRD, 108(10):103507, 2023
2. **Verma A., Ben-Dayan I. et al,** *Gravitational-wave background in bouncing models from semi-classical, quantum and string gravity*, JCAP, 09 (2024) 058
3. **Ben-Dayan I., Kumar U., Shimon M., Verma A.,** *Impact of Low ell's on Large Scale Structure Anomalies*, JCAP 02 (2025) 069
4. **Kumar U., Ajith A., Verma A.,** *Evidence for non-cold dark matter from DESI DR2 measurements*, arXiv:2504.14419, Submitted to PRD

4. **Ben-Dayan I., Kumar U., Verma A**, *Disentangling the Origins of the NANOGrav Signal: Early Universe Models and ΔN_{eff} Bounds*, arXiv:2508.15134, Submitted to PRD

Conferences

- Dec 2023 Oral presentation at Current Trends in Cosmology and High Energy Physics, CCSP, SGT University.
- Apr 2024 Oral presentation at The 69th Annual Meeting of the Israel Physical Society.
- Jul 2024 Poster presentation at CosmoVerse@Krakow 2024, Anomalies and Tensions in Cosmology.
- Feb 2025 Flash Talk and Poster presentation at High Energy and the Cosmos Workshop, AGASS, Ariel University

Research Interest

My research interest is in Computational Cosmology. My research focuses mainly on Gravitational Waves, Inflationary cosmology, Bouncing Models, Cosmic Microwave Background, etc. I am well-versed in Data Analysis techniques, and I am also planning to incorporate Machine Learning in my research in the near future.

Internships/Workshops

- July 2022 **IASTRO Summer Internship**, Instituto de Astrofísica e Ciências do Espaço (IA), Lisbon.
In this program we developed a research project as well as science communication projects, accompanied by researchers from the IA and the Faculties of Sciences of the Universities of Lisbon or Porto.
- June 2022 **Machine Learning in Solar Physics and Space Weather**, IISER, Kolkata.
The workshop was an outcome of the Indo-Swedish SPARC project and was conducted in hybrid mode. The focus of this workshop was to introduce the application of advanced machine learning tools to the solar physics and space weather community.
- Feb 2024 **SIGRAV International School 2024 - Measuring Gravity**, Vietri sul Mare, Italy.
The Italian Society for General Relativity and Gravitational Physics (SIGRAV) International School was dedicated to a comprehensive exploration of precision measurements in gravitational research. This school gave me a thorough overview of recent experiments and cutting-edge detection techniques across various gravitational measurement domains, ranging from atoms up to the cosmos.
- May 2025 **LULBI - Light & Ultralight BSM Interactions**, Weizmann Institute of Science, Israel.
This school brought together theorists and experimentalists, covering lectures and discussions on a broad range of light beyond-the-Standard-Model scenarios, including precision physics and light dark matter.
- May 2025 **CosmoVerseWorkshop@Naples**, Naples, Italy.
Engaged in discussions linking observational cosmology, survey systematics, and fundamental physics, with a focus on cosmic tensions. Contributed to interdisciplinary dialogue between data analysts and theorists.

Awards and Grants

- Jul 2024 Won Grant by **European Cooperation in Science and Technology (COST)** to present my research in the **CosmoVerse@Krakow 2024**.

Jan 2025 Won **Excellence Scholarships in the Field of Space Research and Astro-informatics** award by AGASS at Ariel University.

Master's Research Projects

A. **Study of Dark Matter-Dark Energy Interaction in the Light of Hubble Tension.**

I studied a cosmological model that involves interacting Dark Matter & Dark Energy where coupling between DE-DM is proportional to the density of DE and calculated the value of Hubble Constant in order to see if the Hubble Tension is somewhat alleviated.

Supervisor: Dr. Somasri Sen, Jamia Millia Islamia, New Delhi.

B **Exploring The Impact of Modifications of Gravity Law on Cosmological Observables.**

In this project, I studied the basis of linear cosmological theory of gravity with application to modified gravity and got familiarised with EB code, MGCAMB and also investigated the deviations from the standard cosmological model of a specific modified gravity model.

Supervisor: Dr. Noemi Frusciante, IA and Ciências ULisboa.

Certificates

2022 Data-driven Astronomy, The University of Sydney (Coursera).

2020 Advanced Course on Special Theory of Relativity by Prof. H.C. Verma, IIT Kanpur, India (Online Mode).

2014 Regional Science Olympiad, First Position.

Hobbies

Music, Programming, Philosophy

Art History, Mythologies, Poetry