

Swaraj V.

Cosmology – Dark Matter Halos
Large-Scale Scientific Data Analysis–
N -body Simulations

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EDUCATION	Integrated Master of Science in Physics Cochin University of Science and Technology, Cochin, India	July 2019–Aug. 2025
	Data-driven Astronomy University of Sydney, Sydney, Australia (Online)	Dec. 2023–Feb 2024
PROJECTS	Density Profiles of Dark Matter Halos	Dec. 2023–May 2024
	<ul style="list-style-type: none">Analysed dark matter halos using AbacusSummit N-Body Simulations based on Planck2018 ΛCDM modelProcessed large-scale halo catalogs ($\sim 4.5\text{M}$ data points) to compute mass functions and radial density profilesValidated results against analytical and NFW models, revealing strong consistency across redshifts and insights into structure formation	
	Open-Source Program for Lab Automation	Jan. 2022–July 2023
	<ul style="list-style-type: none">Developed an open-source python program for automating lab equipment, removing reliance on proprietary softwaresImplemented full control of the Keithley 2400 SMU for I–V characterization of diodes and LEDs with integrated data visualizationEnabled reproducible, low-intervention experiments and extensible workflows through open-source customization	
SKILLS	Languages: Malayalam, English, Hindi and Tamil Programming: Python, C++ and SQL Research Tools: Globus, OriginLab, LaTeX, Microsoft Office Software & Development: Git and Nvim	
CONF. & WORKSHOPS	1. NCFMA-2024 <i>Rashtriya Uchchatar Shiksha Abhiyan</i> 2. IUAC Accelerator Science Workshop <i>Inter University Accelerator Centre</i> 3. Workshop on Cyber Security <i>University Union Knowledge Fest</i> 4. SpaceUp CUSAT 2020 <i>The Space Unconference with ISRO Scientists</i>	18 th –19 th Jan. 2024 8 th Aug. 2023 3 rd –6 th Feb. 2020 16 th Feb. 2020
VOLUNTEER WORKS	Active Volunteer, National Service Scheme Participated in community service, awareness campaigns, and volunteering initiatives	2020–2022

AWARDS	1. Cochin University Inter-Zone Arts Festival <i>Runner Up Non-percussion string instruments</i>	2020, 2022
	2. Malappuram Revenue District Youth Festival <i>Four Times Runner Up, Guitar Western</i>	2016–2019
REFERENCES	<p>1. Dr. Charles Jose Assistant Professor, Department of Physics Cochin University of Science and Technology <i>Relationship: Project Advisor, Density profiles of dark matter halos</i></p> <p>2. Dr. Vineeth Mohanan Parakkat Assistant Professor, Department of Physics Cochin University of Science and Technology <i>Relationship: Project Advisor, Development of open-source python program for lab automation</i></p>	