

Devansh Shukla

Five Years Integrated Masters of Science in Physics
Department of Physics
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RESEARCH INTEREST

Investigation of General relativity and other modified gravity theories.

EDUCATION

2018 - 2023	Five Years Integrated M.Sc. (Physics) [Gold Medal] Department of Physics, Sardar Vallabhbhai National Institute of Technology Surat, India (svnit.ac.in)	CGPA: 9.70/10
2016 - 2018	Senior Secondary Education Kendriya Vidyalaya No.1 Sagar Madhya Pradesh, India	93.0%
2014 - 2016	Higher Secondary Education Kendriya Vidyalaya No.1 Sagar Madhya Pradesh, India	CGPA: 10/10

RESEARCH EXPERIENCE

2023-24	Neutral particle motion around a Schwarzschild-de Sitter Black Hole in $f(\mathcal{R})$ gravity Advisor: Prof. Kamlesh Pathak This project investigates the presence of a Schwarzschild-de Sitter solution in the metric constant-curvature $f(\mathcal{R})$ gravity. It examines the horizons and existence conditions for near-extreme and hyper-extreme Schwarzschild-dS solution. Further, it computes the approximated solution to the innermost stable circular orbit for a time-like particle around SdS solution. [https://arxiv.org/abs/2401.15795]
2023	Master's thesis: Cosmology in $f(\mathcal{Q})$ gravity Advisor: Prof. Kamlesh Pathak This project investigates in detail the motivations for a special modified gravity theory called the $f(\mathcal{Q})$ gravity. It represents a sharp departure from Einstein's general relativity due to its consideration of metric incompatibility and the torsion tensor. This work deals with computing the Friedmann's equation and developing a numerical solution to the dust evolution model. [DissertationReport]
2022	Orbital motion of a test particle in STVG gravity around a static spherically symmetric solution Advisor: Prof. Kamlesh Pathak This project involved examining the existence of a static spherically symmetric solution in the Scalar-Tensor-Vector Gravity and developing an effective potential to compute the radius of the innermost stable circular orbit(ISCO) for timelike and lightlike trajectories. [https://arxiv.org/abs/2211.02008]
5-30th July 2021	Summer Student: Hamburg International Summer School Particles, Strings & Cosmology [certificate] Department of Physics, Universität Hamburg and DESY Lessons on general relativity, QFT, modern topics in cosmology, particles, string theory with some basic German culture and language courses.
12-23 July 2021	International Summer School on The interstellar Medium on Galaxies from the Epoch of Reionization to the Milky Way [ISM; certificate] observational constraints, the interpretative tools and the theoretical frameworks used for studying the interstellar medium in galaxies from the epoch of reionization to contemporary Universe
7-18th June 2021	Summer Student: Escape Summer School, LAPP [certificate] <ul style="list-style-type: none">The aim of the school was to provide theoretical and hands-on training on Data Science and Python development for Astronomers. [github.com/escape2020/school2021]
January 2021	The 2020 University Physics Competition [report ; certificate] <ul style="list-style-type: none">Earned bronze medalFor computing trajectory and fuel required for Ion Thruster powered Space-craft from Earth to Saturn; utilized open-sourced repo PoliAstro for orbital calculations and a python script for fuel calculations.

June-Sept 2020	SWANtenna20 - Antenna Design Challenge: Online [certificate] <ul style="list-style-type: none"> Participated in SWANtenna20 conducted by TLC IUCAA, Pune. It involved simulating a novel design of dual orthogonal linear polarization antenna with effective radiative coupling over 50 MHz to 500 MHz. As a follow-up to this project, I was able to simulate a novel vertically stacked kite shaped antenna [techrxiv.19785499.v1]
November 2020	Vela Pulsar: Dispersion measure and time period This project involved writing a python based analysis pipeline for computing the dispersion measure and the time period of the Vela Pulsar(PSR J0835-4510) using the data collected by the Ooty radio telescope. [Vela Analysis]
January 2020	Hands-On Programme <ul style="list-style-type: none"> Sky Watch Array Network, Raman Research Institute, India Hands-on experience with Murchison Widefield Array(MWA) at Gauribidanur Field Station(GBD), RRI, India.
March-May 2019	SWAN Imaging Challenge: Online <ul style="list-style-type: none"> Participated in the imaging challenge which involved making a 100 <i>sq deg</i> radio image of CAS-A from the data collected during late 2017 by the Sky Watch Array Network, RRI, India.
May-June 2019	Visiting Student <ul style="list-style-type: none"> Digital Signal Processing Lab, Raman Research Institute, Bangalore, India Advisor: Prof. Avinash Deshpande

PUBLICATIONS

Preprints

- [1] **D. Shukla**, K. Pathak, "Neutral particle motion around a Schwarzschild-de Sitter Black Hole in $f(R)$ gravity." arXiv, 2024. doi: 10.48550/ARXIV.2401.15795 [https://arxiv.org/abs/2401.15795]
- [2] **D. Shukla**, A. M. A, and K. Pathak, "Orbital motion of a test particle around a Schwarzschild's Black Hole in STVG gravity." arXiv, 2022. doi: 10.48550/ARXIV.2211.02008 [https://arxiv.org/abs/2211.02008]
- [3] **D. Shukla**, Y. Modi, and K. Pathak, "DESIGN OF A NOVEL VERTICALLY-STACKED KITE-SHAPED ANTENNA". TechRxiv, 19-May-2022, doi: 10.36227/techrxiv.19785499.v1. [10.36227/techrxiv.19785499.v1]

COMPUTATIONAL SKILLS

Languages:	Python, C/C++, Fortran 95, Vue.js
Platforms:	Linux, Windows
Version control:	Git
Software & Tools:	L ^A T _E X, Mathematica, GNU Octave, WxMaxima, WIPL-D Pro, Altair-FEKO

RELEVANT COURSES

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| • Mathematical intuition behind Special and General Relativity [certificate] | • Cosmology [HISS 2021] |
| • General Relativity [HISS 2021] | • Special Relativity |
| • Advanced Quantum Mechanics | • Quantum Mechanics |
| • Electrodynamics | • Electromagnetics |
| | • Tensor Calculus |
| | • Nuclear and Particle Physics |
| | • Classical Mechanics |

PERSONAL PROFILE

Date of Birth:	9 th February, 2001
Address:	Devansh Shukla, H.No. 269, Triveni Complex, Lajpatpura Ward, Sagar, Madhya Pradesh, India(470 002).
Languages:	English C1: IELTS Academic – 8.0 Deutsch A1.1: A1.1 Hindi

REFERENCE(S)

Prof. Kamlesh Pathak	Professor , Department of Physics, Sardar Vallabhbhai National Institute of Technology, Surat, India Email: knp@phy.svnit.ac.in
Dr. Dimple V. Shah	Associate Professor , Department of Physics, Sardar Vallabhbhai National Institute of Technology, Surat, India Email: dshah@phy.svnit.ac.in