University of Swaziland
Physics Department
PHY 499: Physics Projects 2024/2025

"A Physicist is just an atom's way of looking at itself"
-Niels Bohr

For more information check http://www.physics.uneswa.ac.sz/

Title	Supervisor	Status
1. Exploring nuclear properties with quantum machine learning techniques	Dr. M. Dlamini	Taken
2. Quantum Cryptography with Quantum Key Distribution	Dr. M. Dlamini	Taken
3. Performance optimization and machine learning analysis of the Kwaluseni campus 82.56kWh solar PV grid-tied mini-grid	Dr. M. Dlamini	Taken
4. Environmental Impact of Accelerated Industrialization on Natural Water Quality about Locations in Matsapha	Dr. N. Mdziniso	
5. Clinical Implementation of Diagnostic Reference Levels in Radiology Centers at Eswatini	Dr. N. Mdziniso	
6. Clinical Implementation of Quality Assurance Tests for X-ray Equipment in Radiology Centers at Eswatini	Dr. N. Mdziniso	
7. Developing a Low-Cost Solar Charge Controller using a Microprocessor.	Dr. B. Muchono	
8. IoT-Enabled Microclimate Sensor for Real-Time Temperature and Humidity Data.	Dr. B. Muchono	
9. Dose Modelling and Characterisation of a 6 MV Linear Accelerator Photon Beam	Dr. N. Mdziniso	
10. Irregular diffusion of Brownian colloids in complex and confined media	Dr. M. Matse	
11. Modelling interfaces for capacitive energy storage in closed nanopores	Dr. M. Matse	
12. Gravitational Waves Illuminate fundamental physics	Dr. N. Zwane	

13. Effects of Dark Energy in the early universe	Dr. N. Zwane	
14. Collective behaviour of living matter with non-reciprocal interactions: violations of Newton's third law.	Prof. S. K. Mkhonta	
25. Physics of pattern formation: from packed oranges to mud crack patterns.	Prof. S. K. Mkhonta	
16. Exploring ways of Determining a Typical Metereological Year (TMY) for Matsapha.	Dr. G. Mavimbela	
17. Urban Residential Energy Demand in Eswatini.	Dr. G. Mavimbela	
18. Validations using ATLAS 13 TeV Gamma-Gamma 2020 real data, matching simulated samples of Standard Model processes and a selection of Beyond the Standard Model signals.	Dr. S. Liao	
19. Jet reconstruction using ATLAS Monte-Carlo simulated samples corresponding to Standard Model hadronic physics processes	Dr. S. Liao	
20. State Resolved Differential Cross Section of H	Dr. Nkambule	
21. Electronic structure studies of diatomic systems: A Quantum Chemistry approach	Dr. Nkambule	
22. Inelastic Quantum scattering Cross section analysis for Gerade/Ungerade molecular symmetries	Dr. Nkambule	