

STUDY OF ASTROPHYSICS

A DISSERTATION SUBMITTED TO ST. XAVIER'S COLLAGE

MAHUADANR

AFFLICATED TO NILAMBER PITAMER UNIVERSITY

BACHELOR OF SCIENCE

BY

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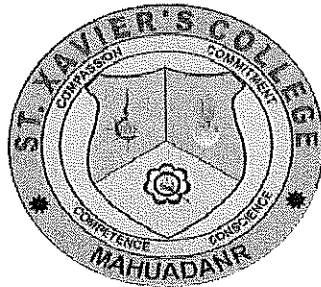
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Semester-6

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CERTIFICATE

This is to certify that the project work entitled “**ASTROPHYSICS**” submitted to St. Xavier’s collage Mahuadanr in partial fulfillment of requirement for the award of Bachelor of Science in Physics to be awarded by the **University of Nilamber Pitamber** is a bonafide record of the work carried out by **Miss. NISHA ROSE TIGGA** (Reg. No. -NPU2020013226) during the academic year 2020-2023.


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ACKNOWLEDGEMENT

First of all, I praise and thank the **ALMIGHTY GOD** from the depth of my heart for showering his grace love and blessing to make this Endeavour possible.

I am profoundly thankful to my beloved principal. **Fr. M. K. Joseph SJ** for allowing me to study the under-graduate course in this historical institution.

I thank **Md. Zafar Aqubal, (MSc.Net), Head of the Department of Physics,** St. Xavier's collage, Mahuadanr-822119, for allowing me to take this project and permission to use the lab and the instruments available in the department.

Prof. (Sir) Zafar Aqubal (MSc. Net) was my guide for this project work. I am extremely grateful for his inspiring guidance, useful discussions and encouragement throughout the project work and whose meticulous and patient guidance has enriched me personally and intellectually.

I thank **Fr. Dr. Samir Toppo S J** Administrator of St. Xavier's collage Mahuadanr, who allowed me to use the computer all the time during the collage hour.

I express my heartfelt thanks to my fellow students who encourage me to finish this project work successfully.

Nisha Rose Tigga
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SESSION - 2020-23

CONTENT

CHAPTER-1

ASTROPHYSICS & ASTRONOMY

1.1 Introduction to astrophysics.....	8-9
1.2 Astrophysics.....	9
1.3 History.....	10-11
1.4 Observational Astrophysics.....	11-12
1.5 Theoretical Astrophysics.....	12-13
1.6 Polarization.....	13
1.7 Astronomy.....	13
1.8 History of Astronomy.....	14-15
• Ancient History	
• Renaissance to modern era	
• Modern era	
1.9 DISCOVERIES.....	15-17
• Bodies	
• Solar	
• Galactic	
• Diffuse objects	
• Compact stars	
• Cosmic	
• Phenomena	
1.10 METHODS.....	17-18
• Instruments	
• Technique	
• Integration	
• Adaptive	
• Data analysis	
1.11 SUBFIELDS OF ASTRONOMY.....	18-19
• Solar astronomy	
• Planetary astronomy	
• Galactic astronomy	
• Gravitational wave astronomy	

absolutely nothing? For this, we need to aim at a different form of Heisenberg's uncertainty principle.

From this formula, we understand that if we can observe the vacuum for a very short period of time or reduce the time uncertainty then the potential for energy production will increase. If we observe for a longer time i.e. increase the time uncertainty then the probability of energy generation will decrease.

This is, absolute vacuum and quantum field fluctuations will continue. Now in absolute vacuum, quantum field will result in two waves that are opposite to each other. As a result, we will not see any energy will build up for a short period of time and vanish again. However, particles and antiparticles are constantly created for no apparent reason in a very short period time. Then immediately it merged again and became vanish. However, their presence is evidenced by the various reactions caused by them. Such as the Casimir effect. If two planets are placed close to each other in the vacuum, the two planets coincide with each other. Because the outside space is more than the space between the two planets and having more space means more virtual particles will be created there. As a result, the outward net force will be greater and the planets will collide. This is the Casimir effect. Now let's see the relationship between virtual particles and Hawking radiation. Most of what we see around us? 99.999% of a skyscraper building is empty space because the materials used to build buildings are made of atoms. And we know that atoms are most empty. That is, if the atoms to build this building are taken out with the spaces between them, the entire skyscraper will be like a grain of rice. This same thing applies to our bodies. So most of the local universe is empty space. Like all other vacuums surrounding the event horizon of a black hole. One of which will be a particle with positive energy and the other will be an antiparticles with negative energy happen. Nut what would not normally happen here is that the black hole would absorb the negative energy of the antiparticles before the two particles collided with each other. As a result, between particles and antiparticles formed at the event horizon of the black hole, the antiparticles will be absorbed by the black hole. Now after absorbing the antiparticles i.e. negative energy, the positive energy will remain. We can see this positive in the form of radiation. This is called Hawking radiation. Now the radiation we see coming out of a black hole will mainly come from the empty around the black hole's event horizon. On the other hand, the negative energy absorbed by the black hole will decrease the total energy of the black hole. As result, the total mass of the black hole will decrease with time. A black hole will disappear through this process.

Ajay Kumar Seno