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ABSTRACT OF THE DISSERTATION

Title

By NAME

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Abstract.

Acknowledgements

Acknowledgments.

Acknowledgment of previous publications P1.

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Chapter 1

Introduction and Background

1.1 Stars

It is common knowledge that the star closest to Earth is the Sun, and also that the Sun is yellow. It is this yellow sunlight which is interesting for some of its properties [1]. For instance, plants, algae, and cyanobacteria convert this light into energy via photosynthesis. In Figure 1.1 is a photo of a galaxy which contains many stars.

Figure 1.1: Barred spiral galaxy NGC 1300 photographed by Hubble telescope. While the galaxy in the photo is not our sun, it does emit light, much like our sun. Image credit: NASA.

The stars in the sky are of particular interest to the aptly named Scientific and Technological Advanced Research Laboratories (STAR Labs), which in many recent experiments has shown promising results in converting this energy in a non-photoelectric sense into usable energy [2]. Interestingly, STAR Labs has theorized

that the famous superhero known as "Superman" converts the light from our sun, which grants his fantastic abilities. There are many methods in industry for converting the sun's energy (of about $1000\,\mathrm{W/m^2}$) into electrical energy. Some of these are highlighted in Table 1.1.

Table 1.1: Renewable energy installations around the world – the energy generated at these sites is ultimately derived from the sun

installation	type	capacity (GW)	location
Longyangxia Dam	photovoltaic	0.85	China
Gansu Wind Farm	wind	6	China
Sihwa Lake	tidal	0.254	South Korea

Chapter 2

Methodology

The process of data collection began with analysis of the physical principles underlying optical light emission.

2.1 The Various Types of Light

Depending on the energy of a photon, it may be referred to as "light" (in the case of optical photons) or as something else – for example, a gamma ray. By convention, there are many names for these particles.

2.1.1 Low-energy photons

The lowest energy electromagnetic radiation is carried by radio waves.

2.1.2 Intermediate-energy photons

These include several types of radiation, including the usually-harmful ultraviolet (UV).

Microwaves

Microwaves have wavelengths on the order of 1×10^{-2} m, or a few cm.

Visible light

Visible light is that which is detectable by the human eye, with wavelengths about 380 nm to 750 nm.

Appendices

Appendix A

Experimental Equipment

A telescope and a spectrometer were used to analyze the sun. Many other instruments were used.

Appendix B

Data Processing

Data was processed before being added to this document.

Acknowledgment of Previous Publications

P1 Publication 1.

P2 Publication 2.

P3 Publication 3.

REFERENCES

[1] G. D. Scholes, G. R. Fleming, A. Olaya-Castro, and R. Van Grondelle, "Lessons from nature about solar light harvesting," *Nature chemistry*, vol. 3, no. 10, p. 763, 2011, doi:10.1038/nchem.1145.

[2] B. Allen and W. West, "Attosecond-length perception of events toward truly sustainable energy," *Journal of Ultrafast Physics*, vol. 42, no. 1, pp. 43–45, 2019.