

Telescopes and their importance in astronomy research paper examples

[Environment](#), [Earth](#)



Stars are heavenly bodies that are spherical in shape and shine because of nucleic and thermal fusion of radioactive particles within them and this is only for part of its life since the hydrogen may burn out or gets exhausted. Some of them can be seen at night from the earth but just as points because of their great distances . The sun is a star that is closest to the earth, whose mass makes up 99% of the solar system and chemically made up of hydrogen that fires it up and it also contains helium. It has great influences on systems of wind, seasonal changes and very many other factors even life itself since it is the major source of energy on the earth.

This great importance on the earth creates the need to learn its structure and phenomenon. This led to development of instruments such as telescopes that use electromagnetic radiations such as visible light to observe objects far away from the earth such as the stars and other heavenly bodies. The word telescope is a Greek word for look or sees.

Telescopes changed the world's view of the universe and nature which was earlier based on Aristotle's theory that the earth was the centre of all other heavenly bodies. This theory was greatly considered by the Catholic Church but was incorrect. Galileo built his own telescope to view the heavens due to curiosity after news reached him of a device that could see objects far away from the earth. He discovered the four moons that orbit planet Jupiter which were later called the Galilean moons and which objected the church's view by the fact that other heavenly bodies orbit some other bodies other than the earth. His telescope also made a conclusion that the earth is far smaller compared to the universe which is very large than had been imagined and confirmed the Copernican theory that the sun is the centre of the universe

and not the earth.

With time technology has greatly led to change and modification of telescope designs, bringing new ideas and properties that provide a wider view and at is greater distance. There are various types of telescopes of which differ depending on structure and their properties while others are as a combination of one or more types. They focus light coming from objects at a distance to form their image and have an eyepiece which magnifies the image for the image to be clearly viewed by the eye. They form images by either refracting images through a lens of by reflecting light by a mirror while some are a combination of both.

- Refractor telescope- has a small lens at the back and a big lens at the front. They have small focal length and small apertures hence result to lower magnification compared to other telescopes. There are two types of refractor telescopes one being the standard refractor and the other is the apochromatic refractor. They differ by the fact that the latter concentrate the red, green and blue light at the same point but the former focuses these light at different points. Refractor telescopes are advantageous because they portable because of their small size and have a large field of view. They are disadvantage by the fact that they are expensive especially the apochromatic, have got low magnification because of small focal length and have small apertures.

- Dobsonian telescope- these are telescopes with large apertures that do not use lenses but large mirrors which reflect light entering at the front of the telescope and direct it to a smaller mirror which is at the front of the telescope. The smaller mirror reflects the light at the side to the eyepiece,

which can focus by moving inwards or outwards. They are advantaged by having large apertures also they are less expensive. They are disadvantaged because they are large and hard to move about and are not good for astrophotography: can only be mounted on ALT AZ.

- Newtonian telescopes are the same with the Dobsonian the difference being that they can be mounted on ALT AZ and equatorial.

- Schmitt Casegrain- these are telescopes with large apertures that do not use lenses but large mirrors which reflect light entering at the front of the telescope and direct it to a smaller mirror which is at the front of the telescope. However, the smaller mirror reflects the light at the back of the telescope by passing through a hole on the large mirror where the eyepiece is found. The light can be focused by moving the large mirror inwards or outwards. They have large focal length hence greater magnification, suitable apertures and the large focal lengths makes them good for imaging planets. They are expensive than the previous ones, require collimation at regular times, and requires cooling due to the correcting by the front plate which heats up.

- Maksutov Casegrain- it is similar to the Schmitt telescope. The difference being that the plate for correcting the light at the front of the telescope is thicker for the Maksutov than the Schmitt.

Some telescopes; the ground based telescopes are established in harsh and remote areas with few inhabitants. For example the mountain tops which are cold, dry, clam, and have factors that affect astronomy on the minimum such as temperature, cloud cover, water vapor, wind speeds, sky brightness, and atmospheric turbulence. Another good example is the ridge on the Antarctic

plateau which is very calm with very little atmospheric turbulence. These areas are less polluted so looking through a telescope produces very clear images and the atmosphere is very thin e. g. on mountain tops.

In order to get more and clear information there has been the need to establish the telescope on different places such as the earth, the earth's orbit moving them as high as possible from the ground. This has a more clear and crystalline view of planets, galaxies, stars and the universe.

However, telescopes based on space are very expensive to build. Building telescopes on the earth is cheap and easy to maintain. Nevertheless, space based telescope are advantageous because there is no disruption from atmospheric conditions resulting to a clearer and sharper images and don't have to deal with weather. Also light is not scattered by the atmosphere which causes stars to twinkle. In space there is also the ability to observe different light wavelengths that is difficult to observe from the earth.

However, they are disadvantaged by size which influences the cost of developing and lofting into space.

People are able to learn the nature of objects far away from the earth by using light from them. By using the different frequencies and wavelengths of light of which some cannot be seen by the naked eye therefore telescopes have devices that can detect other wavelengths of not only visible light making it easy for astronomers to study more. The wavelengths are the coded by computers into colors that we can see. This enables them to study nature of those objects such as composition, speed and temperature. Use of other wavelengths like those of radio waves for example the square kilometer array which can view a star even before it lit up. The telescopes

are able to manage different wavelengths of light from gamma rays to radio waves by having detectors fitted on them that can detect the wide range of wavelength

References

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