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Eclipses

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Abstract:- An Eclipse is an awe-inspiring celestial event that drastically changed the appearances of the two biggest objects in our sky i.e our sun and moon.

This paper introduces eclipses as astronomical event and special cases of solar and lunar eclipses ,types of solar and lunar eclipses.

Keywords*: Celestial events, Eclipses, Cycles of Eclipses, Earth-moon System.*

1. Introduction

The first person to give scientific explanation was Anaxagoras [c500BC-428BC].

Anaxagorous states that the moon shines by the reflected light from the sun.

An eclipse is an awe-inspiring celestial event that drastically changes the appearances of heavenly bodies.

An eclipse is an astronomical event which occurs when an astronomical object or spacecraft is temporarily obscured by passing into the shadow of another body or by having another body pass between it and the viewer.

When the apparent size of the eclipsed body is much smaller than that of the eclipsing body the phenomenon is known as an occultation.

A transit occurs when as viewed from Earth or another point in space a relatively small body passes across the disc of a larger body Mercury or Venus for example periodically transit the sun and a natural satellite may transit it's planet.

An eclipse is the result of either an occultation (completely hidden) or a transit (partially hidden).

Examples are the disappearance of a star ,nebula or planet behind some body of the solar system.

Extrasolar planets have been observed when they perform a transit of their stars.

The term eclipse is most often used to describe either a solar eclipse when the moon's shadows crosses the earth's surfaces or a lunar eclipse when the moon into the earth's shadows.

For the special cases of solar and lunar eclipses these only happens during an eclipse season . The two time of each year when the plane of the Earths's orbit around the sun crosses with the planes of the moon orbit around the earth and the line defined by the intersecting planes points near the sun.

The types of solar eclipse that happens during each season depends on apparent sizes of the sun and moon.

If the orbit of the earth around the the sun and the moons orbit around the earth were both in the same plane with other then eclipse would happen every month there would be a lunar eclipse at every full moon and a solar eclipse at every new moon.

If boths orbits were perfectly circular then each eclipse would be the same type every month .

Lunar eclipse can be viewed from the entire nightside half of the earth.

But solar eclipses particularly total eclipses occuring at any one particular point on the earth's surface are very rare events that can be many decades apart.

2. Eclipses

For any two objects in space a line can be extended from the first through the second the latter object will block some amount of light being emitted by the former creating a dragon of shadow around the axis of the line.

Typically these objects are moving with respect to each other and their surrounding to the resulting shadow will sweep through a region of space only passing through any particular location in the region for a fixed interval of time. As viewed from such a locations this shadowing event is known as an eclipse.

The region of an objects shadow's during an eclipse is divided into three parts.

The Umbra within which the objects completely covers the light sources.

The antumbra extending beyond the tip of the Umbra within which the object is completely in front of the light source but too small to completely cover it.

The penumbral within which the object is partially in front of the light source.

A total eclipse occurs when the observer is within the Umbra an annular eclipse when the when the observer is within the antumbra and a partial eclipse when the observer is within the penumbral.

As observed from the earth a solar eclipse occurs when moon passes in front of the sun.

The types of solar eclipse event depends on distance of the moon from the earth's during the events.

A total solar eclipse occurs when the earth's intersects the Umbra portion of the moon shadow.

When the Umbra does not reach the surface of earth the sun is only partially occulted.

Resulting in an annular eclipses partial solar eclipses occurs when the viewer is inside the penumbra.

Solar eclipses are relatively brief events that can only be viewed in totality along a relatively narrow track.

3. Lunar Eclipses

Lunar eclipses occurs when the moons passes the earth's shadows.

This happen only during a full moon, when the moon is on the far side of the earth's from the sun.

Earths-Moon Systems

An eclipse involving the Sun, Earth and Moon can occur only when they are nearly in a straight line allowing one to be hidden behind the another viewed from the third. Because the orbital plane of the moon is tilted with respect to the orbital plane of the earth (the ecliptic) eclipses can occur only when the moon is close to the intersection of these two planes.

The sun Earth and nodes are aligned twice a year during an eclipse season and eclipses can occur during a period of about two months around these times.

Between 1901 and 2100 there are the maximum of seven eclipses four(penumbral) lunar and three solar eclipses 1908,2038.

Four solar and three linear eclipses 1918,1973,2094.

Five solar and two lunar eclipses 1934.

A Lunar eclipse lasts longer taking several hours to complete with totality itself usually averaging anywhere from about 30 minutes to over an hour.

4. Cycles of Eclipses

The Eclipses of the sun and moon occurs at new moon and full moon respectively so that one basic time period involved in the occurrence of eclipses is the synodic month i.e the interval between successive new moon as seen from Earth.

5. Phenomena observed during Eclipses

During the Eclipses the Surfaces of the moon cools at a rate dependent on dependent on the constitution of the lunar soil which not every where the same.

Many spot on the moon sometimes remail brighter than their surrounding during totality particularly in their output of Infrared radiations possible because their heat conductivity is less but the cause is not fully understand.

Towards the direct light from the diminishes very quickly and colour changed the sky near the zenith becomes dark but along the horizontal Earth atmosphere still appear bright because of the narrow extent of the Umbra the moon shadow on Earth.

6. Conclusion

In this paper Celestial event such as Eclipses have been presented in details. The paper also introduces earth-moon system and phenomena observed during Eclipses.

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