

# Unlocking Eclipses and Planetary Distances

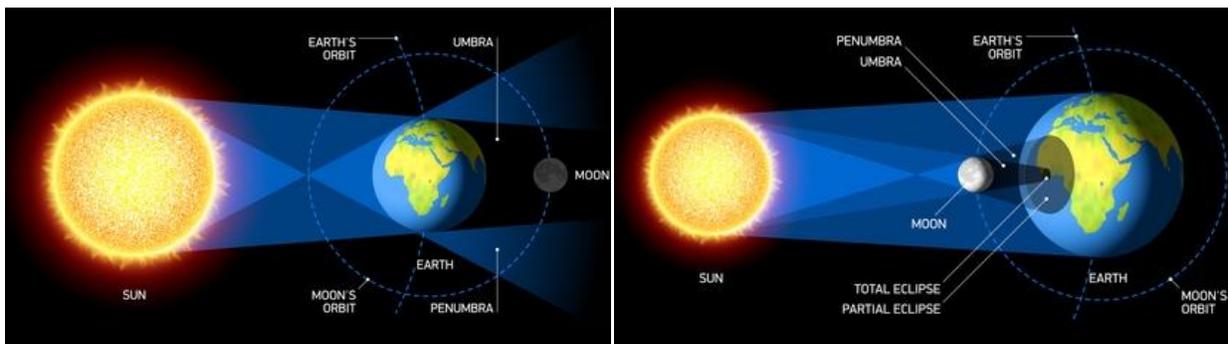
Gopi Krishna Vijaya



Eclipses are natural phenomena that have fascinated mankind since antiquity. The sight of the Sun being blotted out by the Moon, or the Moon glowing a fiery red, are truly astronomical wonders to behold. The view of these phenomena has changed substantially over time. In the historical and mythological records of several cultures, an eclipse was perceived as, for example, the Celestial dragon swallowing the Sun (Chinese), Fenris wolf swallowing the Sun (Nordic/Scandinavian), Rahu and Ketu – immortal demons – swallowing the Sun (Indian), Jaguar swallowing the Moon (Inca) or Bear attacking the Sun and Moon (Pomo tribe, North America). The motif of an aggressive force swallowing the Sun has been predominant in these stories.

In addition to this, there is a fear of contamination from the eclipse in the myths around the world. The ancient Babylonians substituted real Kings with other people to protect the Kings. Many orthodox Indians take a bath after a solar eclipse and fast in order to prevent the food tainted by the eclipse from affecting them. Several other cultures have also seen eclipses as omens of destruction, disaster, or ill-luck.

Today's opinion has pretty much discarded all these ideas as primitive superstitions, and the only possible danger that the modern person attributes to an eclipse is perhaps damage to the eyes while trying to view the eclipse without proper filters. As for the fact that the Sun and Moon have nearly the exact same size in the sky: it is simply attributed to a cosmic "coincidence". The reasons for both solar and lunar eclipses have been converted into a straightforward matter of light and shadow, and are usually represented by diagrams with shining lights and marbles like this:



Thus, for all intents and purposes, there appears to be no further explanation necessary for the entire event. As the saying goes – case closed. Or is it?

In science, it is always necessary to constantly re-examine assumptions afresh, even those that appear extremely simple and straightforward. Like the water that surrounds the fish unnoticed by it, or like the air that we are surrounded by without normally noticing it, the concepts and ideas that surround the world view also become second nature with time, and some questions might get missed in the process. For instance, the explanation given for one of the most amazing spectacles displayed to all of humanity in the heavens – the equal sizes of the Sun and the Moon – is “coincidence.” A coincidence simply states that two things occur together, which is not really an explanation, since it is a known fact. One cannot simply claim that it is *just* a coincidence, but accept that the real answer is “reasons are unknown.” This will open the door to other ideas.

One also notices that in the diagrams, all the lines are straight lines, caused by light. Hence, all the understanding of astronomical relationships is dependent on the radiating nature of light. In the last resort, with either a powerful telescope or an infrared spectroscope, light radiation is the primary source of our information about the cosmos.

### The “Coincidences”

For an eclipse, the primary fact is that the Sun and Moon appear the same size from earth. Usually, astronomical textbooks then go ahead to describe how far the Sun is compared to the Moon. But there are more “coincidences”: the time taken for the Moon to rotate once around itself (27.32 days) is the same as the time taken for the Sun to rotate once on its axis (~27.3 days, called the Carrington rate). So taken together, the rotational velocity of the Sun and the Moon are also matched almost exactly.



**27.3 days      27.32 days**

It is astonishing that both with respect to space and time the Sun and Moon are perfectly complementary. The Moon and the Sun also each occupy  $\frac{1}{2}^\circ$  angle in the sky, so together at any single time in the sky the Sun and Moon constitute  $\frac{1}{360}$  of the sky. Essentially, they together define the circle. As one looks closer, the coincidences pile up quite quickly<sup>1</sup>. This is true not just between the Sun, Moon and the Earth, but all through the Solar System.<sup>2</sup>

But regardless of all these coincidences, is it not true that the Sun is very far away? How does one even know if the idea of “far” is valid in the same way? To address this question, some concepts would be required, derived from the Reciprocal System (RS) of Physics, since the nature of space and its relation to distance have to be re-evaluated for astronomical phenomena.

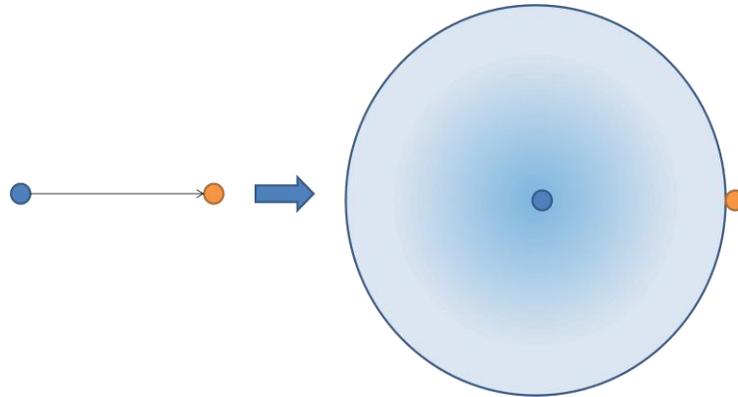
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<sup>1</sup> Cameron, Fred, *Our Impossible Moon*, [http://thefoolsjourney.net/our\\_impossible\\_moon.pdf](http://thefoolsjourney.net/our_impossible_moon.pdf)

<sup>2</sup> Martineau, John, *A Little Book of Coincidence*, Walker Books, 2002.

### 3D coordinate system

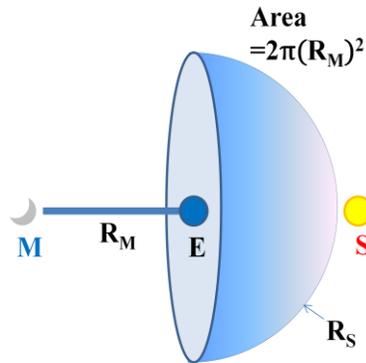
According to the RS, the space that we perceive is only one *kind* of space called coordinate space, which is usually represented with the 3-axis x-y-z system. All the dimensions are spatial dimensions, whereas time is perceived only as a scalar quantity. However, this form of space has a limit, which is imposed by the inward movement of gravity. Once this limit is crossed, the nature of space changes from linear to angular; therefore one is no longer looking at a linear extension or *distance*, but instead its angular equivalent: *a solid angle*. This angular measure alters the vectorial nature of space, where there is no longer a specific direction that one can point to. This transformation is depicted below:



Since the nature of space becomes scalar, it mimics the behavior of time as we experience it, so to confirm this idea, one has to look at the values of 27.3 and 365 again: the time periods of the Moon and the Sun around the Earth. There is a unique relation between them:

$$\left(\frac{365.25}{27.3}\right)^2 \cong 180$$

This coincidence indicates that the periods of the Sun and the Moon on either sides of the Earth are related by the square function and half a circle. This is how one “reads” the equation, to see the functional relationships implied. Since this holds true for the time, does it hold true for the distances as well? If it does, then one has to construct a half circle of some sort on one side and relate it to a line. Also, if the quantities are to be related by the square function, it means there is an area involved, not a length, so an image like the following naturally gets formed, with a line on one side and a surface of a hemisphere on the other:



**Moon-Earth-Sun System**

This is exactly the solid angle system described previously, with one difference: there is a hemisphere instead of a sphere. With our perceptions, it is not possible to directly perceive the negative half of the spherical shell, since scalar space does not become negative by definition. Hence it is possible to look at the Moon-Earth-Sun system with this hemispherical shell on one side and a real extension or distance on the other side.

Let  $R_M$  and  $R_S$  be the distance to the Moon and Sun, and  $R_E$  be the radius of the Earth (~3960 miles). The known data is:

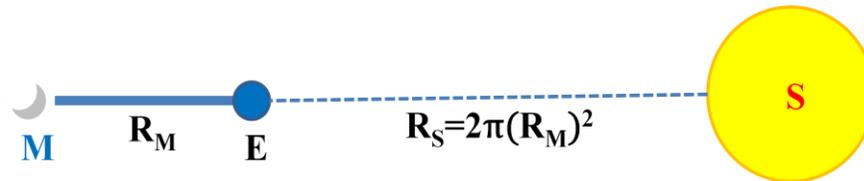
$$R_M = 60.5 R_E \text{ (varies between } \sim 56\text{-}64 R_E) \qquad R_S = 92955807 \text{ miles } \sim 23474 R_E$$

If the Earth's radius  $R_E$  is taken to be equal to one (i.e. in  $R_E$  units, which is used for the rest of the paper):

$$R_M = 60.5 \qquad R_S = \mathbf{23474} \text{ (also = 1 A.U.)}$$

$$\text{Surface Area} \qquad 2\pi(R_M)^2 = \mathbf{22998} \text{ (~98 \% of } R_S)$$

This is a very close match. Its interpretation is as follows: On the left of the figure, there is the usual distance to the Moon. On the right, however, it might *appear* that one is measuring the distance to the Sun, but in reality the value is the same as the surface area of the hemisphere with the same radius as that of the Moon. The solid angle expresses itself as this surface area. There is a polarity between the light that is received from the Moon and that from the Sun: the light from the Moon is received *radially*, while that from the Sun is received *peripherally*. In other words, the radial distance to the Sun measured is not the real distance at all, but the hemispherical surface area *taking on the appearance of a distance*. This is like measuring the length of a string in a piece of cloth and calling the cloth "1 mile long" because of the length of string used.



Naturally all the values oscillate a little bit, because of variation in the movements of the heavenly bodies, but the overall point is very significant:

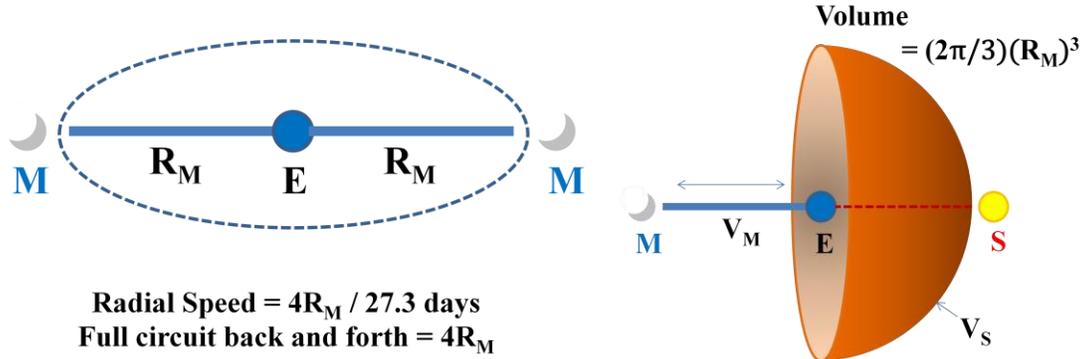
***What we see as the distance of the Sun, is possibly a linear stretching out of something that is actually a hemispherical surface area/solid angle. If we convert the 2D area into a 1D line, we get a very large value, making it appear as though the Sun is very far away and very big.***

Since our understanding of distances is entirely dependent on the nature of light, if light changes from a radial to a peripheral form, humans would not detect it because of the habitual sensory assumption of a standard 1D radiating behavior. This is also very similar to seeing a diffuse source of light as a bright focused light in a concave mirror, since the eye only perceives by projecting the image back linearly. Since this linearity is assumed of the Sun, it would be the same with regard to all distances of the planets of the Solar System which reflect sunlight. The relation between the Sun, Moon and Earth hence unlocks the distance-relations in the Solar System.

Thus both with respect to space and time, there is an intimate relation between the Sun and the Moon. Not only do they look the same from our viewpoint and rotate at the same rate, but also the distances and times for movement around the Earth also show symmetry. The difference in orientation must be taken into account: for the Moon, the radial distance has meaning, while for the Sun, the periphery has meaning. The Sun and Moon have the same rotational periods since they are like two halves of the same coin.

## Light-speed

Now let the speeds be considered instead of distances. It is straightforward to observe that a moving line creates a plane, and a moving plane creates a volume. Since we matched a length ( $R_M$ ) with an area ( $2\pi(R_M)^2$ ) the next natural step is to match the velocity of the Moon with a volume. In other words, the speed of the Moon taken linearly between Moon and Earth will have to be compared with the hemispherical volume to get the value between the Earth and the Sun.



Velocity of Moon projected along the diameter: One back-and-forth motion over the diameter in 27.3 days.

$$= 4R_M/27.3 \text{ days} \quad = \quad 4 \times 60.5 R_E / 2358720 \text{ sec} \quad = 0.000102598 / \text{sec (units of } R_E)$$

Now, the volume of the hemisphere is  $\frac{2}{3} \pi R_M^3$ . Therefore, one has to multiply the velocity by this amount (units of  $R_E$ ):

$$\text{Volume of the Hemisphere} = \frac{2}{3} \pi (60.5)^3 = 463793.6$$

$$\text{Corrected Speed (wrt Sun)} = 463793.6 \times 0.000102598/\text{sec} = \mathbf{47.6 / sec}$$

$$\mathbf{\text{Light-speed (units of } R_E)} = \mathbf{186282 \text{ miles/sec} \div 3960 \text{ miles} = 47 / \text{sec}}$$

The quite surprising result derived is that if the movement of the Moon is converted from circular to linear and then corrected by the hemispherical volume, one obtains the value for the light-speed within about 1%. This indicates quite clearly that the relation between the Moon and the Sun is by no means arbitrary. Light actually turns out to be a 'shear' between the Sun and the Moon.

Consider unrolling a ball of thread. The rate at which the size of the ball shrinks is much slower than the rate at which the string is pulled out. It is as if one were to mistake the *volume* of a ball of thread to be a *length* of thread, and by assuming a straight line movement an enormous velocity is obtained. Thus:

*The light-speed is directly derived from the movements of the Sun and the Moon, and its large value is because of the dimensional correction applied to the velocity. A 3D measurement is interpreted as a linear 1D measurement. This holds true only when mediated by the Earth, which is why all units require Earth's radius to be used for reference ( $R_E = 1$ .)*

Following the coincidence of the Sun and Moon during the eclipse has led to several interrelationships like these. The next question is naturally: "What does this signify for greater celestial distances?"

## Planetary Distances

Having identified a radial-peripheral feature for the distances of the Sun and the Moon, the next natural step is to determine the distances to the other planets. Following Copernicus' calculations, all distances to planets were first found out as a ratio of the Earth-Sun distance (= 1 AU). In these calculations the nature of space is assumed to be the same as the traditional 3-dimensional space that is found within the gravitational limit. Based on this, the orbital periods are calculated.

PLANET	Distance ' <i>r</i> ' from Sun (in Astronomical Units or AU)	Period ' <i>T</i> ' of Orbit (in years)	$r^3/T^2$
Mercury	0.390	0.24085	1.0226
Venus	0.723	0.61521	0.9985
Earth	1.000	1.00000	1.0000
Mars	1.524	1.88089	1.0005
Jupiter	5.203	11.8653	1.0005
Saturn	9.539	29.6501	0.9873
Uranus	19.18	83.7445	1.0061
Neptune	30.06	165.951	0.9863
Pluto	39.53	247.687	1.0068

Once more, the nature of space beyond the unit boundary requires appropriate conversion. As already mentioned, for velocity relations, it is not the linear *distance*, but the *volume* that is important. For calculations within the gravitational limit of the Earth, time behaves as a scalar function, as usually measured on a clock. Beyond the gravitational limit, since 3D space has reached its limit and cannot vary, variation in time increases to 2D. This is similar to "second power relationships" described by Larson for functions in equivalent space. Hence, variations in time (*T*) vary as the second power ( $T^2$ ), as variations of planetary distance (*r*) occurs as a volume ( $r^3$ ), in the third power. The relation between the two is same as that between the Earth and Sun, which are set to unity:

$$\text{For all planets: } \frac{r^3}{T^2} = \frac{(1 \text{ AU})^3}{(1 \text{ year})^2} = \frac{1^3}{1^2}$$

This is Kepler's Harmonic Law.

Hence, this is the true underpinning of the Copernican System, that the Sun forms a unit boundary for the Earth, and not merely a "zero point of the reference system." The exact same shift that has to be made from the conventional reference system to one based on unit speed, has to be made in astronomy from the conventional "Sun-centered" calculations to treating the Sun as a *unit boundary*: the gravitational limit. And just as a sphere has an inner surface and an outer surface, this particular unit boundary has the Moon on one side, and the Sun on the other side of this boundary.