

Moon illusion

(According to 'MATTER (Re-examined)')

Author: Nainan K. Varghese, matterdoc@gmail.com
<http://www.matterdoc.in>

Abstract: Celestial bodies like the moon, sun, etc. appear considerably larger near the horizon than they do higher in the sky or at the zenith. Between horizon and zenith, gradual reductions in their sizes are apparent. This is contradictory to our general experience that the farther an object is, the smaller it appears. Apparent variation in the size of a celestial body from the horizon to the zenith and back to the horizon is usually called the 'moon illusion' or 'sun illusion'. This category also includes the apparent enlargement of all celestial bodies and the distances between them when viewed at the horizon. In the following paragraphs this phenomenon is represented as the 'moon illusion'.

An alternative concept:

An alternative concept, proposed in the book '*MATTER (Re-examined)*', is based on a single assumption: namely, the existence of matter. Matter, as the substance of physical objects, provides objective reality and positive existence to all real entities. Entities without matter are considered functional constructs and exist only in the minds of proposers and in mathematical analyses. This concept presents an alternative framework for understanding matter, gravitation, inertia, and fundamental particles through the existence of an all-encompassing universal medium formed by particulate matter. An extremely brief summary of this alternative concept is presented below; detailed and logical explanations of the topics mentioned in this article are available in the aforementioned book.

To exist, every point within a block of pure matter must possess affinity with its neighbouring points all around. This property enables a block of pure matter to furcate into minute particles – quanta of matter – and reduce their existence to the minimum possible dimensional space, ultimately becoming 1D objects with positive existence in all three spatial dimensions. Conversely, a 1D quantum of matter may be converted to a 2D object by inward-acting external efforts at its ends, or a 2D quantum of matter may be converted to a 3D object by inward-acting external efforts along its entire perimeter. The entire space is thus filled with quanta of matter in different spatial states without scope for voids.

Neighbouring free quanta of matter, during the process of elongation along their single spatial dimension, may come in contact with others and form weblike latticework structures separately in each plane. These separate latticework formations in all possible planes collectively constitute the universal medium that fills the entire space outside the most basic 3D matter particles. All actions (including creation, sustenance, and destruction of 3D material entities) and apparent interactions by and between material objects are initiated, sustained, and terminated by the universal medium. The universal medium that provides an absolute reference extends infinitely in all directions and encompasses all 3D entities.

Due to the continuous structural changes, the universal medium remains inherently under compression. Gravitation is the compressive pressure exerted by the universal medium on material objects embedded within it. Gravitational pressure on a basic 3D material particle can be positive (push) effort on its convex surfaces, negative (pull) effort on its concave surfaces or have no effort on its flat surfaces.

Gravitation is manifested in a 3D spatial system as various 'natural forces' and other physical efforts. The magnitude of gravitational pressure on a 3D object is proportional to the extent of universal medium in the direction from which the pressure is applied. The extent of the universal medium between two 3D matter particles is always less than that on their outer sides. Consequently, greater gravitational pressures on their outer sides overcome lesser gravitational pressure on their inner sides and push the 3D matter particles towards each other. This apparent interaction between the 3D matter particles is gravitational attraction (gravity).

Structural distortions in the universal medium in and about a material object are the work associated with it, and the stress produced by these structural distortions in the universal medium is its associated energy. Structural distortions in the universal medium create 3D matter particles, and the transfer of the structural distortions carries the enclosed 3D matter particles, causing the inertial properties observed in nature. Structurally distorted regions in universal medium are the fields. Mean directions of work in the fields are represented by imaginary lines of forces. Depending on the direction and curvature of the lines of force, the fields are classified as magnetic, electric, nuclear and inertial fields. Creation and motion of 3D matter particles with higher matter content require higher distortion-density and greater curvature within a larger volume of the surrounding universal medium.

A 3D material entity is enclosed by a structurally distorted region in the universal medium. The region of the universal medium, surrounding the material entities with higher 3D matter content, has relatively higher distortion-density and larger volume.

3D matter particles:

The universal medium gathers free quanta of matter in a structural gap, compresses them into 3D status to form a circular (segmented spherical) matter-core that spins about one of its diameters (frequency) and moves at the highest possible linear speed. Movements of the 3D matter-core are accomplished by the transfer of the structural distortions in the surrounding universal medium. These linearly moving and rotating structural distortions have many similarities

with EM waves in each plane. The linearly moving, spinning 3D matter-core and the rotating structural distortions in the surrounding universal medium together form the most basic 3D matter particle.

The universal medium stabilises parameters of this basic 3D matter particle by moving it at the highest possible (hence critical constant) linear speed and spinning it at a spin speed (frequency) proportional to its 3D matter content. At this stage, it becomes a photon or a corpuscle of light or radiation. Photon's 3D matter-core forms the material part, and the linearly moving rotating structural distortions in the surrounding universal medium form the EM wave part. Photons are the most basic 3D matter particles. In different combinations they form all other fundamental particles and superior 3D material entities in nature.

The linear speed of a photon is a critical constant and is determined by the ability of the universal medium to transport 3D material. The spin speed (frequency) of a photon is proportional to its 3D matter content. Photons with higher 3D matter content spin faster and thus have higher frequency. As long as the linear and rotary speeds of a photon are maintained steady by the universal medium, its 3D matter-content remains constant. Attempts to alter the linear speed of a photon result instead in changes to its 3D matter-content (frequency), achieved by exchanging quanta of matter with the surrounding universal medium.

Light is a continuous flow of photons (3D material corpuscles). Each photon is carried by the linear transfer of rotating structural distortions in the universal medium at a critical constant speed. At its critical linear speed, push effort from the rear by the universal medium balances the resistance to its motion by the universal medium. An attempt to increase a photon's linear speed corresponds to an increase in the 3D matter content of its 3D matter-core by collecting quanta of matter from the universal medium and thereby increasing its frequency (blue-shift). Similarly, an attempt to reduce a photon's linear speed corresponds to a reduction in the 3D matter content of its 3D matter-core losing quanta of matter into the universal medium and thereby lowering its frequency (red-shift).

Moon illusion:

The moon illusion is based on both the clear difference in apparent size between the moon viewed at the horizon and the moon viewed at the zenith as well as on the gradual reduction in the observed size of the moon as it appears to move from the horizon to the top of the sky. This phenomenon is applicable to all other celestial bodies also when they are viewed from the earth.

Earth is a large 3D material body. The universal medium in and around it is structurally distorted. In other words, the earth is enclosed in a structurally distorted region of the universal medium, as represented in figure 1. Distortion density in the universal medium near the earth's surface is high, and it gradually reduces as the distance from its surface increases outward. Due to the earth's spherical shape, the extent of the structurally distorted region of the universal medium along the tangential direction from its surface (observer) to the horizon is much larger than the extent of the structurally distorted region in the vertical direction from its surface to the zenith (as shown in figure 1). A light ray arriving from a celestial body (viewed at the horizon) along the

tangent to the earth's surface has to travel a much larger distance through the structurally distorted region of the universal medium than a light ray arriving from the same body (viewed at the zenith) in a vertical direction to the earth's surface.

As soon as the light ray enters the structurally distorted region in the universal medium around the earth, the mechanism of its speed control attempts to slowdown the constituent photons. An attempt to slow down a photon compels its 3D matter-core to discard quanta of matter and reduce its 3D matter content and lower its frequency (redshift). Reduction of 3D matter content helps the photons to maintain their linear speed at the critical constant level. The magnitude of the red-shift of light from the celestial body, observed by an observer on the earth's surface, depends on the distance traversed by the light ray through the structurally distorted region of the universal medium.

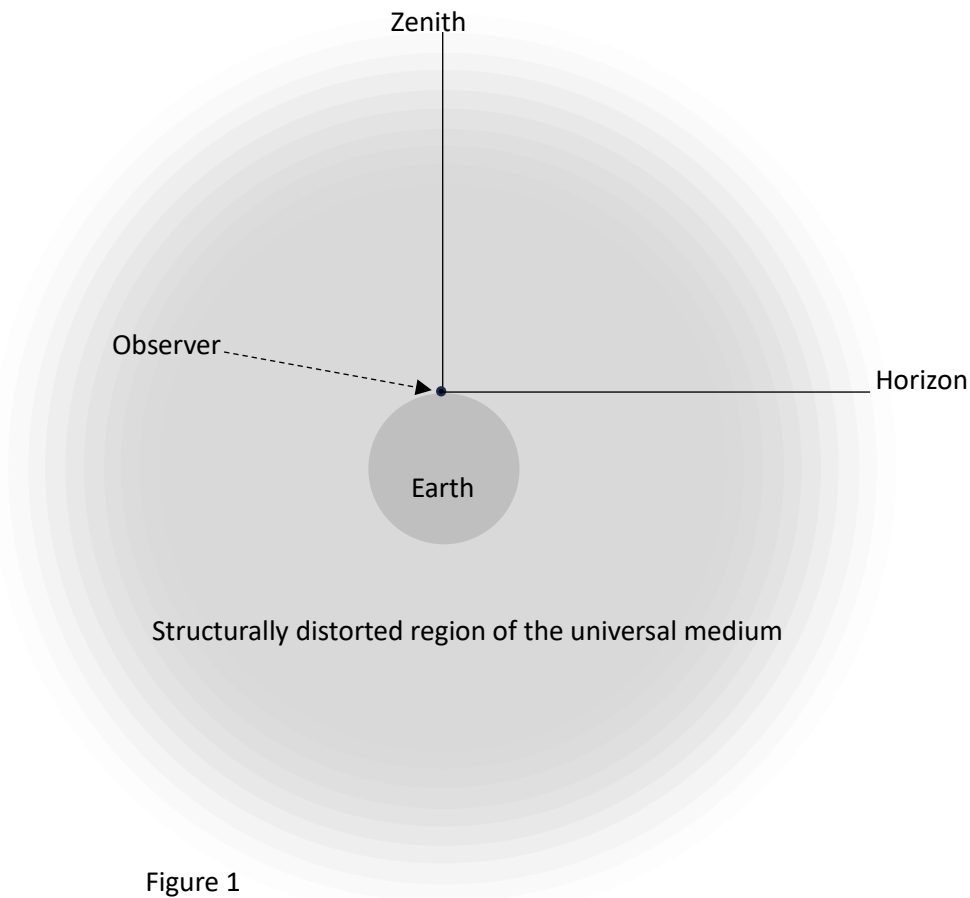
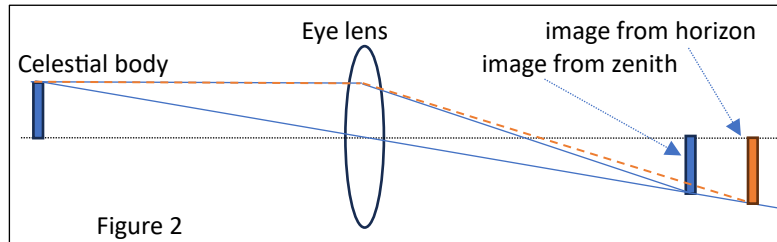


Figure 1

Therefore, light from a celestial body when viewed at the horizon is red-shifted by a larger margin than the light from the same body when viewed at the zenith point. This is the reason why the sun and the moon appear reddish in the morning and evening. When the celestial bodies are

at the horizon, light rays emanating from them are highly red-shifted by their passage through a larger extent of the distorted region of the universal medium. The magnitude of redshift reduces as the celestial bodies move towards the zenith points, where the redshift is least.

The magnitude of refraction of light passing through a convex lens depends on the frequency (colour) of the light. Red light is refracted least, and blue light is refracted most. As the celestial body appears to move from the horizon to the zenith, the frequency shift of the light from it depends on the extent traversed through the structurally distorted region of the universal medium. Frequency shift is more when the body is viewed at the horizon and it is least when the body is viewed at the zenith.



In figure 2, a celestial body is shown on the left. Light from the body viewed at the horizon, passing through the longer path in the distorted region of the universal medium around the earth, is shown by the red dashed line. Due to lower frequency, the light is refracted by the observer's eye lens and focused on the retina as a larger image. When the body is viewed higher in the sky, the redshift of its light is reduced due to the lesser extent of the structurally distorted universal medium traversed by the light, and the image observed by the observer becomes smaller. Changes in the focal point are compensated by the observer's vision mechanism. Thus, we see an apparent gradual reduction in the size of the image as the celestial body moves from horizon to zenith. This phenomenon is neither a result of variation in the size of the object nor variation in the distance between the observer and the celestial body. Hence, this is an illusion.

Due to the combination of different lens materials in achromatic/apochromatic lens systems that are used in telescopes and other scientific optics, multiple frequencies of light are focused to the same point. Photographing a celestial body in various conditions, mentioned above, is unlikely to show differences in its size. Hence, no apparent enlargement of celestial bodies at the horizon is seen in photographs by these cameras.

Reference: 'MATTER (Re-examined)' <https://www.amazon.com/dp/1492241865>,
<https://www.amazon.com/dp/1492241881>

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