STELLAR ABERRATION

According to 'MATTER (Re-examined)'

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Abstract: Reversals of Earth's direction of motion in its orbital path around the Sun are an essential requirement for contemporary explanations of stellar aberration. Earth's orbital path around the Sun is an apparent concept. Reversal of direction of motion of a macro body of the size of the Earth and moving at the real linear speed of the Earth, in a three-month period, without affecting its integrity, is irrational. However, considering corpuscles of light as 3D matter-particles can provide a logical explanation for this phenomenon.

Keywords: Stellar aberration, astronomical aberration, aberration of light

Apparent displacements of celestial objects about their locations are referred to as stellar aberration (astronomical aberration or aberration of light). All contemporary explanations of this phenomenon are based on the assumption that the Earth moves around a static sun in an elliptical orbital path. In that, the Earth is assumed to reverse its direction of motion every six-month period. The average relative linear speed of the Earth, with respect to the Sun, is estimated at 29780 m/sec. Even without considering the linear speed of the solar system (as a whole), it is absurd to think that a composite macrobody of Earth's size and moving at this linear speed can reverse its direction of motion in three months' time and yet maintain its integrity. Therefore, the explanations of stellar aberration, based on reversal of Earth's direction of motion, are not rational. Similarly, explanations of many other phenomena, based on the apparent orbital path of Earth around the Sun, also need reconsideration.

We now know that the sun is a moving object. It is physically impossible for a mechanically unattached macro body to move around another moving object in any sort of closed geometrical path. Therefore, a planetary body's orbital path around a central body is imaginary. Heliocentric solar system is an apparent structure, derived from the relative positions of planets about the sun (in an assumed static state). Each planetary body is assumed to move around the central body in elliptical/circular path. Apparent orbital paths are good for predicting phenomena associated with the relative positions of central and planetary bodies. However, they cannot give correct results if used to determine the real parameters of the macrobodies or their paths.

All cosmic bodies, except stable galaxies, have translational motions in space [1]. Currently, the linear speed of the Sun is estimated at about 250000 m/sec. Earth and the whole of the solar system move with the Sun at this linear speed. At this linear speed, no planetary body in the solar system can orbit around the Sun, but it may orbit about the Sun. A planetary body moves with the Sun at a median linear speed equal to the Sun's linear speed. It moves in a wavy path about the sun, periodically moving to the front and to the rear of the sun. The linear speed of the Earth in its median direction of motion varies between (250000 + 29780) m/sec and (250000 – 29780) m/sec. Median direction of motion never reverses; it is maintained along with the Sun's direction of motion.

Alternative concept, presented in the book, 'MATTER (Re-examined)', envisages light as constituted by a stream of photons (corpuscles of independent 3D matter-particles with associated structural distortions in the universal medium). Observer's motion cannot affect photons in any way until they are physically received by the observer. Since the direction of motion of light cannot be affected by the observer's motion, in the case of light, the belief that '*aberration causes objects appear to be angled or tilted towards the direction of motion of observer, compared to when the observer is stationary*' is a fallacy.

However, having 3D matter-cores, the photons are gravitationally attracted (limited by certain restrictions) towards other 3D material bodies. Directions of rays of light passing near the solar system are affected by gravitational attraction towards the macrobodies in the system. Sun, being by far the largest macr body in the solar system, (for approximate estimations) the whole 3D matter-content of the solar system may

be assumed to be concentrated in the Sun. A ray of light passing near the solar system bends towards the sun, under gravitational attraction.

Figure 1 shows the relative locations of the Sun and Earth during one apparent orbital period (one solar year). The central line represents a small part of the Sun's curved path around the galactic centre. The sun is represented by a large black circle moving from right to left. Large grey circles show the positions of the sun at intervals of 6 weeks. A small black circle represents Earth, and small grey circles show the relative positions of Earth corresponding to the location of the sun at different positions. Dashed curved line shows Earth's real orbital path about the Sun for a duration of one solar year. The difference in curvatures of the Earth's orbital path on either side of the Sun's path is due to the small scales used in the figure. In reality, they are almost the same shape.

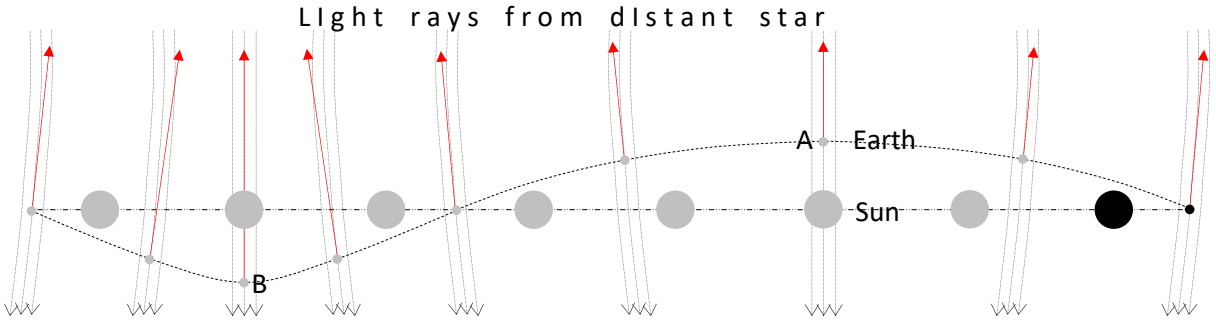

Figure 1

Thin dotted lines represent rays of light from a distant star. Three parallel rays are shown near each position of the Earth. Photons in light rays bend towards the sun under gravitational attraction. Bend-rays of light, received by the observer on Earth, appear to come from different directions, and the distant star appears to have shifted in the direction of the line of sight, indicated by red arrows. This apparent deflection of the position of a distant star causes stellar aberration.

A change in the direction of aberration is caused by alternating locations of the Earth relative to the Sun. For half of the apparent orbit (from A to B in the real orbital path, as shown in the figure), Earth is in front of the Sun. For the remaining half of the apparent orbit (from B in the figure to a position similar to A in the next half cycle of Earth's real orbital path), Earth is behind the Sun. Hence, the direction of deflection of rays of light from a distant star (towards the Sun) is effectively forward, from Earth's position at A to its position at B. For the rest of Earth's relative position from B to A (in the forward direction), the direction of deflection of rays of light from a distant star is effectively rearward. Reversal of the direction of Earth's motion is not an essential requirement to recognize stellar aberration.

Magnitude and direction of stellar aberration, from any planetary body, depend only on its relative position with respect to the central body. As the aberration is caused (mainly) due to the 3D matter-content of the central body, its magnitude and direction from all planetary bodies (at any particular relative position) are identical, irrespective of their linear speed or the size of their apparent orbital paths.

If a distant star is located in the plane of the orbital paths of the Sun and Earth, it appears to move forward and backward in the same plane. If the location of a distant star is 90° to the plane of the orbital paths of the Sun and Earth, it appears to move upwards and downwards (in the vertical direction) relative to the orbital paths. If a distant star is located in any other direction, its apparent displacement traces elliptical/circular figures in space.

As the distance travelled by the solar system, in a solar year, is considerable, the difference this makes in the relative direction of distant stars (various types of parallaxes) also has to be accounted for. To account for stellar aberration, light rays from a distant star should have a constant direction relative to the observer, who is moving with the solar system in (almost) a linear direction within the galaxy. Therefore, measurements of stellar aberrations of light rays from stars in nearer galaxies become erroneous.

Reference:

[1] Nainan K. Varghese, *MATTER (Re-examined)*, https://www.matterdoc.in/

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