

the observer, it is rather has an absolute constant speed – 186,000 miles per second or 300,000 kilometers per second independent of the movements of the source and the observer [18, 19]. Now, the question is why the speed of light is independent of the movement of the source and the observer [20]. Because all bodies of our Universe has positive mass [21-23], light never travels in a straight line due to gravitational force exerted from the source as well as the observer. Light always curved from the source to the observer. As the light curved to the observer, it takes little longer time to reach to the observer. So, for observer, it feels to him that the physical time runs slower. The observer cannot recognize the curved path; it seems to him that light travels in a straight line. If both the source and the observer would have zero masses, then would have zero gravity too, light would be in a straight line which is the straight line distance between them. Let, the straight line distance = D and time taken to travel light to the observer in a straight line = T. Then the speed of light,

$$C = \frac{D}{T} \quad (1)$$

If both the observer and the source have masses, the light path curved with a distance $D' > D$, and time taken $T' = T + \tau$ where τ is the amount of physical time slow down for the observer due to the masses and thus due to gravity exerted by both. Then the speed of light-

$$C = \frac{D'}{T'} = \frac{D'}{T + \tau} \quad (2)$$

Case-1:

The source and observer is moving towards each other. Let, at a particular time, the distance is reduced from D' to D'' by an amount d' , time taken is reduced, due to reduced distance, from T' to T'' by an amount t' and due to movement both the source and the observer have more effective masses, due to that time gets more slow down to observer from τ to τ' , then the speed of light is-

$$C = \frac{D''}{T'' + \tau'} = \frac{D' - d'}{T' - t' + \tau'} \quad (3)$$

From equation (1):

$$\frac{D'}{T'} = \frac{D' - d'}{T' - t' + \tau'}$$

$$\text{Or, } D'(T' - t' + \tau') = T'(D' - d')$$

$$\text{Or, } D'T' - D't' + D'\tau' = T'D' - T'd'$$

$$\text{Or, } T'd' = D't' - D'\tau'$$

$$\text{Or, } T'd' = D'(t' - \tau')$$

$$\text{Or, } \frac{d'}{D'} = \frac{t' - \tau'}{T'}$$

$$\text{Or, } \frac{D'}{T'} = \frac{d'}{T' - \tau'} \quad (4)$$

As more speedy they approach to each other, the τ' increases more, T' is a constant, will be the same. To incorporate increased τ' , d' gets reduced, which is more

curved (D'' over D'). As the straight line distance between the source and the observer decreases, the light path is more bent to have the same light path. So, for the observer, it seems that the physical time runs slower and slower. The light path makes all the difference to the observer to feel about the speed of physical time.

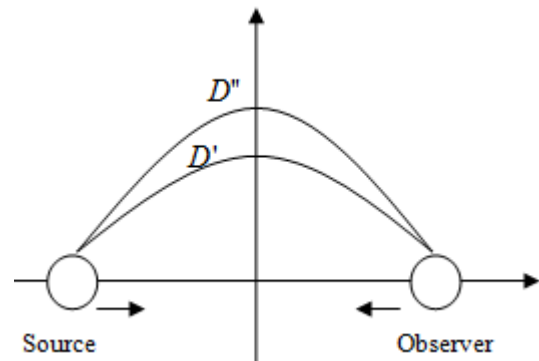


Figure 1: Source and observer is moving towards each other

Case-2:

The source and observer is moving away from each other. Let, at a particular time, the distance is increased from D' to D'' by an amount d' time taken is increased from T' to T'' by an amount t' and due to movement both source and observer have more effective masses, due to that time gets more slow down to observer from τ to τ'' , then the speed of light remains the same.

$$C = \frac{D''}{T'' + \tau''} = \frac{D' + d'}{T' + t' + \tau'} \quad (5)$$

From equation (1):

$$\frac{D'}{T'} = \frac{D' + d'}{T' + t' + \tau'}$$

$$\text{Or, } D'(T' + t' + \tau') = T'(D' + d')$$

$$\text{Or, } D'T' + D't' + D'\tau' = T'D' + T'd'$$

$$\text{Or, } T'd' = D't' + D'\tau'$$

$$\text{Or, } T'd' = D'(t' + \tau')$$

$$\frac{d'}{D'} = \frac{t' + \tau'}{T'}$$

$$\frac{D'}{T'} = \frac{d'}{T' + \tau'} \quad (6)$$

As more speedy they are away from each other, the τ' increases more, T' is a constant, will be the same. To incorporate increased τ' , d' gets increased, which is less curved (D'' over D'). As the straight line distance between the source and the observer increases, the light path is less bent to have the same light speed. So, for the observer, it seems that the physical time runs slower and slower. The light path makes all the difference to the observer to feel the speed of the physical time. As the distance increases it took light to travel greater distance and thus, need more time as well.

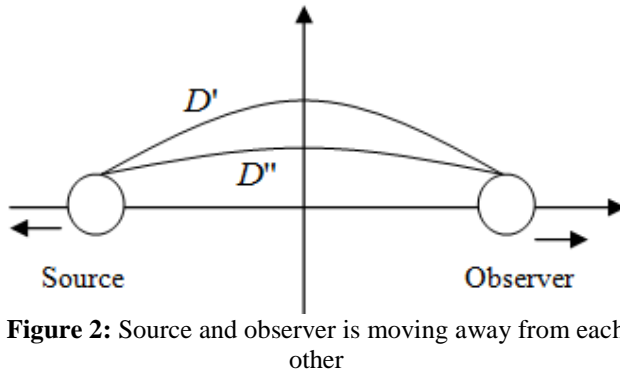


Figure 2: Source and observer is moving away from each other

Case-3:

The source and observer is moving in the same direction towards each other. If the source is moving slower than the observer we can adopt similar mathematics as in case-2 and if the source is moving faster than the observer we can adopt similar mathematics as in case-1. In any case, due to movement, their effective masses increase and effective sizes decrease, thus their gravity also increases in proportion to increased masses which makes observer feel that the physical time runs slow again because the light path bent slightly due to motion in either direction. The faster the observer are moving away, the less the light path bent (case 2) and also light has to travel more distance with the speed of 300,000 kilometer per second, thus need more time to reach. If the source is moving faster than the observer, the light bent is more. In any case, the bent path of light, the decreased size, the increased or decreased distance, and the slowness of the physical time for observer are so fine-tuned to meet the constancy of the speed of light to be 300,000 km per second. Thus for the observer, it looks like the speed of light is the same all the time. Thus, the faster they move away from each other, the light path is less bent (D' compared to D'') due to motion in which observer is faster than source. When the source is faster than observer, the light path is more bent (D'' compared to D'). Thus, light speed is actually independent of the source and observer.

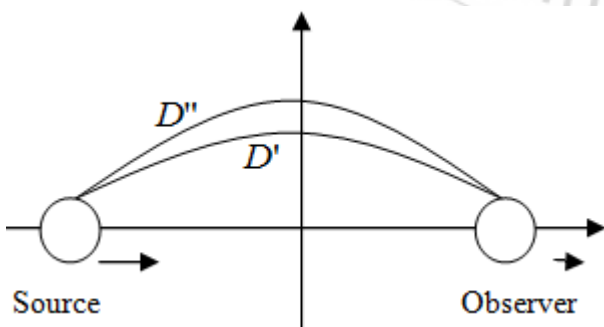


Figure 3: Source and observer is moving in the same direction

If the source and observer are moving on the same direction, due to movement, their effective masses increase and their sizes decrease, thus their gravity also increases in proportion to the increased masses which makes observer feel the physical time runs slow again because the light path bent slightly due to motion. Let, the effective total mass increased

from $M = m_1 + m_2$ (where m_1 is the mass of the source and m_2 is the mass of observer) to $M' = m_1' + m_2'$, (where m_1' is the increased mass of the source and m_2' is the increased mass of observer due to motion), where $M' > M$. Then,

$$M \propto \tau$$

$$\text{Or, } M = K\tau$$

$$M' \propto \tau'$$

$$\text{Or, } M' = K\tau'$$

Where τ is the amount of slowdown of the time due to mass M and τ' is the amount of more slowdown of the physical time due to increased mass M' due to motion (note that all the time the constant is K only, which is an absolute constant)

If the observer moves faster than source, the light path will be less bent (D'), because the distance from the source is increasing. And if Source is moving faster than the observer, the light path will be more bent because the distance is decreasing (D''). The bent path of light, the decreased size, the increased or decreased distance, and the slowness of the physical time for observer are so fine-tuned to meet the constancy of the speed of light to be 300,000 km per second. If both are stationary to each other, the light path bent will be compensated of the slowness of time for the observer. If it would be that both were at absolute rest with zero mass, then light path would be a straight line and there would not be any slowness of time for observer. So, the amount of slowdown of time is no more an observer dependent fact, rather it feels to observer that time slows down which due to more bent of light path.

3. Conclusion

The speed of light is always a constant at 186,000 miles per second or 300,000 kilometer per second. The change in masses due to the motion of objects makes the distortion of the light path to be positively curved. The curvature is directly proportional of the increase of effective masses. Thus, the speed of light is independent of the motion of the source and the observer. The light path will always be bent when bodies are in motion due to increased masses of both the source and the observer. The light path would be negatively bent for anti-particles and for anti-universe as well. The light path is positively bent for us because the bodies are all made of positive matter of our Universe, thus, gravity is always attractive due to all positive masses. The reason why all light-bents are positive and they occupy the upper half of the X axis in an X-Y plane. Thus, we can conclude that the speed of light always has an absolute constancy value: 300,000 kilometers per second or 186,000 miles per second and it is completely independent of the speed of source and the observer- it has an absolute constancy in terms of speed of light is concern.

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