Ballistic Theory of Light

Rajeev Kumar*

Abstract

In this paper an argument has been presented in order to support the ballistic theory of light.

Keyword : Ballistic theory of light.

1 BALLISTIC THEORY OF LIGHT

Ballistic theory of light states that light emitted by a source moving with a velocity **v** with respect to an observer has a velocity

$$\mathbf{c} = \mathbf{c_0} + k\mathbf{v}$$

$$\Rightarrow \mathbf{c} = \mathbf{c_0} + \mathbf{v} \qquad [\ \mathrm{k} = 1\ ]$$

$$\Rightarrow c = c_0 + \mathrm{v} \qquad [\ \text{For one dimension}\ ]$$

where

$\mathbf{c_o}$ = velocity of emitted light from the same source at rest with respect to the observer

2 BINARY STAR SYSTEM

Let's consider two stars in a binary star system at a distance D from Earth and orbiting about their common center of mass in circular orbits with a period

$$T = \frac{2\pi}{\omega}$$

$$\omega = \frac{\mathrm{v}}{r}$$

where

ω = angular speed

v = orbital speed

r = radius of the orbit

Now consider a pulse emitted by a star at time t_S, it will arrive at Earth at time

$$t_E = t_S + \frac{(D - r\sin\omega t_S)}{(c_0 + \mathrm{v}\cos\omega t_S)} \qquad (i)$$

For D >> r and v << c_o , from (i), we get

$$t_E = t_S + \frac{D}{c_0} - \frac{r}{c_0}\sin\omega t_S - \frac{D\mathrm{v}}{c_0^2}\cos\omega t_S \qquad (ii)$$

*rajeevkumar620692@gmail.com

Differentiating (ii) with respect to t_S, we get

$$\frac{dt_E}{dt_S} = 1 - \frac{v}{c_0}\cos\omega t_S + \frac{Dv\omega}{c_0^2}\sin\omega t_S \qquad (iii)$$

$$\Rightarrow \frac{dt_E}{dt_S} = 1 - \frac{v\sec\varphi}{c_0}\cos\left(\omega t_S + \varphi\right) \qquad (iv) \qquad \left[\tan\varphi = \frac{D\omega}{c_0}\right]$$

Now, if

$$\frac{dt_E}{dt_S} < 0$$

it will appear that pulses arrive from more than one position in the orbit at the same received time, i.e., 'ghosting' of the star will occur. For no ghosting,

$$\frac{dt_E}{dt_S} > 0$$

$$\Rightarrow 1 - \frac{v\sec\varphi}{c_0}\cos\left(\omega t_S + \varphi\right) > 0$$

$$\Rightarrow \left|\frac{v\sec\varphi}{c_0}\right| < 1$$

$$\Rightarrow \frac{v}{c_0} \times \sqrt{1 + \left(\frac{D\omega}{c_0}\right)^2} < 1$$

$$\Rightarrow \sqrt{1 + \left(\frac{D\omega}{c_0}\right)^2} < \frac{c_0}{v} \qquad (v)$$

3 CONCLUSION

The condition (v) deduced for no ghosting of a star can be verified with the observed data and consequently ballistic theory of light can be confirmed.

References

1. Kenneth Brecher, *"Is the Speed of Light Independent of the Velocity of the Source ?", 1977.*