Gravitational Lensing Explained in Terms of Energy Field Theory

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Abstract

It is currently accepted in Physics that General Relativity can explain the observed amount of Gravitational Lensing but Classical Physics cannot. The Newtonian calculation for the deflection angle of light, treating light as a gravitating mass, gives only half of the observed amount, whereas General Relativity gives the correct amount. However, in Energy Field Theory space is modeled as being an aether type field that determines the local speed of light and rate of time (due to both light and matter waves being slowed in the space around a mass) so this Classical Physics approach can fully explain the observed amount of Gravitational Lensing, in agreement with General Relativity.

Introduction

In Energy Field Theory (Ref [1]) space is filled with an energy field whose magnitude is determined by the sum of all the masses in the causally connected Universe. The energy of this field is due to the wave functions of every individual particle adding together. Each particle is comprised of a three dimensional standing wave (Ref [2]) that extends to infinity, but with ever diminishing energy density the further away one gets from the particle's centre.

This field's magnitude is proportional to the Gravitational Potential, and the field contributions from many different masses sum together to determine its magnitude at any point in space. In a region of space with a higher magnitude energy field all types of waves, light and matter waves, propagate more slowly. The rate of time is determined by the rate at which physical processes occur, and in turn this is determined by the propagation speed of all the waves that comprise matter, light etc. So in such a region, the oscillation of the waves that comprise condensed matter will be slower, as will the propagation speed of light passing through that region.

Explanation

In the space near a star or planet, the energy field is more intense. For light passing through this space it has two effects:

(1) The oscillations that comprise the light wave occur more slowly. For a passing wavefront, this has the effect of bending the wavefront, as the light nearest the mass will be oscillating slightly slower, leading to a Huygens construction with the wavefront changing direction – bending towards the mass.

(2) The actual speed of propagation of the wavefront will be slower nearer the mass. This also causes the wavefront to bend towards the mass.

As the amount of the slowing in each of these two effects is due to Time Dilation, the equation used in General Relativity (or Energy Field Theory) to express the amount of time dilation due to Gravitational Potential can be used in each case.

Here T_0 is the proper time, T is the coordinate time, and φ is the Gravitational Potential difference between two regions of space:

$$T_0 = T\left(1 - \frac{\varphi}{c^2}\right) \tag{1}$$

Where:

$$\varphi = -\frac{GM}{r} \tag{2}$$

An equivalent form of the Gravitational Time Dilation equation used in General Relativity is:

$$T_0 = T\sqrt{1 - \frac{2GM}{rc^2}} \tag{3}$$

This form of the equation appears when performing calculations using the Schwarzschild Metric (for the gravitational field around non-rotating point masses).

$$ds^2 = -\left(1 - \frac{2GM}{rc^2}\right)c^2dt^2 + \left(1 - \frac{2GM}{rc^2}\right)^{-1} dr^2 + r^2 d\Omega^2 \tag{4}$$

Here, the two effects (mentioned above) are present in the factor affecting the time (t) and distance (r) parameters. As the equation deals with squares, equation (3) results when the square root is taken of both sides.

In the case of Energy Field Theory, the same metric applies and can be used, however, the interpretation is different in that space is of fixed size (i.e. r does not vary depending on the Gravitational Potential) but light's speed slows instead; thus light appears to have traveled through a greater distance of space.

This amount will describe the change due to each of the two effects mentioned above. So the total effect will be double that given in Eq (1).

In the Newtonian calculation for Gravitational Lensing only one of these effects is taken into consideration; that of the slowing of light's propagation near the mass. The effect of Time Dilation on the light wave's rate of oscillation is not considered.

As Energy Field Theory models both these effects, it can explain the full amount of Gravitational Lensing in the way that General Relativity does.

An explanation of how the lensing equation can be derived from an aether type field is given in the section titled "Fermat surface" in the Wikipedia page for "Gravitational Lensing Formalism" (Ref [3]).

Conclusion

Energy Field Theory can explain the full amount of Gravitational Lensing in the way that General Relativity does, due to the modelling of two effects on light as it passes the mass, due to Gravitational Time Dilation.

Note: These two effects are present in the Schwarzschild solution which is used to calculate the Gravitational Lensing in General Relativity. It is also used to explain the advance of the perihelion of Mercury, and thus the same calculation used in General Relativity (Ref [4]) applies to Energy Field Theory also.

REFERENCES

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