OSP Journal of Physics and Astronomy

Short Communication

Mistaking Refraction for Gravity is the Error that Launched Einstein's Career

Rowland D

Independent Researcher registered with ORCID, Canada

Corresponding Author: David Rowland, Independent Researcher registered with ORCID, Canada.
E-mail: david222@hush.com

Received: April 12, 2024; **Accepted:** April 19, 2024; **Published:** April 25, 2024

Abstract

In 1916, Albert Einstein published his paper on general relativity (GR), the geometric theory of gravity in which he presumed that hypothetical 4-D spacetime curves/warps and in so doing affects the gravity of massive objects (stars, planets). This is an impossibility. Geometry is an abstract (nonphysical) form of mathematics that is incapable of interacting with the physical force of gravity. Spacetime is a mathematical fiction that does not exist, does not curve, and has zero effect on gravity. Unfortunately, invalid GR theory has become the current description of gravity in modern physics because of a fundamental astrophysical error in interpreting data from the 1919 solar eclipse. Mistaking refraction for gravity is the fundamental error that launched Einstein's career. Refraction bends light. Gravity cannot.

Key words: *General Relativity; Gravity; Refraction; Spacetime; Gravitational Lensing*

Introduction

In 1916, Albert Einstein published his paper on *General Relativity*, the geometric theory of gravity [1]. According to general relativity (GR), the force of gravity is associated with the curving/warping of hypothetical 4-D spacetime. This is an impossibility. Geometry is an abstract (nonphysical) form of mathematics that is incapable of interacting with the physical force of gravity. Spacetime is a mathematical fiction that does not exist, does not curve, and has zero effect on gravity.

General Relativity

In 1915, Albert Einstein developed his theory of *general relativity*, the geometric theory of gravitation that is the current description of gravity in modern physics [1]. Einstein proposed that gravity is the result of a geometric distortion of four-dimensional spacetime by massive objects. The more mass that produces gravity in a body, the more distortion you get. This distortion supposedly changes the trajectories of objects moving through space and even the paths of light rays as they pass close by massive objects. Simply stated, massive objects bend the space around them, causing other objects to deviate from the straight lines they otherwise would have followed. Einstein chose the Minkowski spacetime model to depict graphically the gravitational forces supposedly implied in general relativity [2].

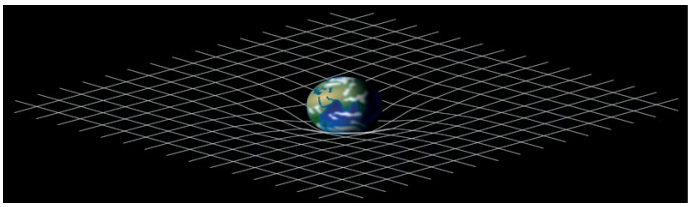

Figure 1. Hypothetical Fabric of Spacetime

In this hypothetical model, a massive object (planet or star) appears to be sitting on a fourth-dimensional spacetime fabric, weighing it down as a heavy ball would to a rubber membrane in three dimensions. A beam of light passing close by the Sun, for example, would hypothetically follow the lip of the curved spacetime fabric, causing it to bend towards the Sun (rather than pass by it in a straight line). General relativity thus depends on the following three unverifiable assumptions: (1) 4-D spacetime is real, (2) spacetime curves, and (3) spacetime interacts with gravitational forces of massive objects.

Spacetime Illusion

Spacetime is a mathematical model that fuses the three dimensions of physical space and the abstract (nonphysical) dimension of time into a single four-dimensional physical continuum. This is an imaginative graphical excursion that bears no relation to reality [3].

Suppose a world of two dimensions could exist and you wish to represent it on a three-dimensional graph. How would you know if that circle you see is a sphere, a cone, a cylinder, a dome, or something else? It is not possible to extrapolate meaningful information from two dimensions into three, nor from three into four.

Time measures the changing positions of objects and sequences of events that occur within space. Time is an abstract (nonphysical) measurement within the 3-D. Time cannot be extracted from space and projected onto a fourth supposedly physical axis with its own independent set of reference points. Whatever model you create that includes mathematical measurements of an intangible dimension cannot possibly be real. To believe in spacetime is to believe in at least one direction to which one cannot point.

Spacetime cannot curve because spacetime is not real. It is an illusion. All Einstein accomplished with 4-D modelling was a fanciful graphic diversion that cannot possibly exist. Nothing about it explains how gravity could possibly bend light.

Disproof of General Relativity

Although *general relativity* is the accepted definition of gravitation in mainstream physics, this theory is fatally flawed. Spacetime is the geometric illusion that can be expressed algebraically as $3\,D + 0\,D = 4$ D (where D = dimension). Logic tells us that geometric spacetime is not real, does not exist, does not curve, and cannot possibly interact with or be affected by gravity [3].

Geometry is the branch of mathematics which describes the properties and relations of points, lines, and surfaces – as well as the relative locations of objects. Mathematics is an abstract form of measurement and not a physical thing. As such, geometry can neither cause nor influence anything that exists in physical reality. General relativity fails because it presumes that a physical force (gravity) interacts with an abstraction (geometry) that has no physical existence.

Newton's Prediction

In his 1704 treatise on optics, Isaac Newton predicted that that beams of light passing close to the Sun would bend very slightly (refract) toward the Sun [4]. He predicted that light from distant stars grazing by the Sun would seem to "fall" just a bit towards the Sun as they passed by, resulting in a slightly curved trajectory. Surrounding the Sun is the photosphere, a dense gaseous layer about 100 km thick. Light passing through the photosphere is refracted, bending as it moves through a transparent substance.

Einstein's Prediction

Einstein predicted that beams of light passing close to the Sun would bend very slightly toward the Sun because of alleged gravitational attraction. His theory of general relativity predicted a tiny degree of deflection towards the Sun that was approximately twice as much as Newton's.

Deflection of light is measured in arcseconds. An arcsecond is one $3{,}600^{th}$ of a degree, or the angle made by the hypotenuse of a right-angled triangle one inch high and 1.9 miles long. This is an infinitesimal deviation to be able to measure from the Sun, which is 93 million miles away. The difference between Einstein's and Newton's predictions was statistically insignificant.

Solar Eclipse of 1919

Frank Watson Dyson, Astronomer Royal of Britain, conceived the perfect experiment to test Einstein's theory [5]. A total solar eclipse on 29 May 1919 would occur just as the Sun was crossing the bright Hyades star cluster (about 151 light-years away). Light from these stars would have to pass by the Sun's gravitational field on its way to Earth and would be visible during the darkness of the eclipse.

Arthur Eddington photographed reference positions of the Hyades stars during January and February of 1919 from Oxford, England (51.7520^0N, 1.2577^0W; temp 40^0F). Then, in May he went to the remote island of Principe (1.6139^0N, 7.4057^0E; temp 80^0F) to photograph the stars' positions during the eclipse.

Andrew Commelin went to Sobral, Brazil (3.7015^0S, 7.4057^0E, temp 80^0F) in May to photograph the stars' positions during the eclipse and stayed there to photograph reference positions two months after the eclipse. Both teams superimposed reference photos over the eclipse photos to see how much the Sun's gravity may have deflected light from these stars.

Eddington's results from Principe showed an average deflection of 1.61 arcseconds. Crommelin's results from Sobral showed an average deflection of 1.98 arcseconds. The average of these two readings, 1.795 arcseconds, was consistent with Einstein's prediction [6]. In his *Brief History of Time*, Stephen Hawking says of the 1919 deflection results: "*Their measurement had been sheer luck, or a case of knowing the result they wanted to get, not an uncommon occurrence in science*" [7]. The errors in data were as large as the effect they were trying to prove, thus making these results inconclusive.

An Overnight Celebrity

The 1919 Solar Eclipse made Einstein the world's most famous scientist [8]. On 9 November 1919, page six of the *New York Times* carried this story: "*Eclipse Showed Gravity Variation. Diversion of light ray accepted as affecting Newton's principle. Hailed as epoch making. British scientist calls the discovery one of the greatest of human achievements.*" Three days earlier, Eddington and Dyson had shown off their results at a joint meeting of the Royal Society and the Royal Astronomical Society [9].

Mistaking refraction for gravity is the fundamental error that launched Einstein's career. Refraction bends light. Gravity cannot.

Gravitational Lensing is a Misnomer

A gravitational lens is defined as a distribution of matter between a distant light source that is capable of bending light from its source as the light travels toward the observer. The amount of bending is construed as evidence supporting Einstein's theory of general relativity [10]. Thus, gravitational lensing is a misnomer. Refraction bends light. Gravity cannot.

A so-called gravitational lens produces a maximum deflection of light that passes closest to its center, and a minimum deflection of light that travels furthest from its center. This is simply because the refracting photosphere of a massive star decreases in density in proportion to its distance from the surface of said star.

Conclusion

A fundamental error in misinterpreting data from the 1919 solar eclipse made Albert Einstein the world's most famous scientist. In 1916, Einstein published his paper on general relativity, the geometric theory of gravity in which he falsely presumed that hypothetical 4-D spacetime curves/warps and in so doing supposedly affects the gravity of massive objects (stars, planets). This is an impossibility. Spacetime is a mathematical fiction that does not exist, does not warp, and cannot possibly interact with gravity.

During the eclipse of 1919, light from the bright Hyades star cluster was refracted as it passed through the dense photosphere of the Sun. Arthur Eddington and Frank Watson falsely proclaimed to a joint meeting of the Royal Society and Royal Astronomical Society that deflection data from the 1919 eclipse was proof for Einstein's geometric theory of gravitation. Without this erroneous publicity, the world would never have heard of Albert Einstein. Refraction bends light. Gravity cannot.

Citation: Rowland D (2024) Mistaking Refraction for Gravity is the Error that Launched Einstein's Career. *OSP Journal of Physics and Astronomy* 5: JPA-5-157.

References

1. O'Connor JJ., Robertson EF (1996) General Relativity. History Topics: Mathematical Physics Index. *Scotland: School of Mathematics and Statistics*.
2. Rowland D (2020) What Einstein did not consider about gravity. *OSP Journal of Physics and Astronomy* 1.
3. Rowland D (2021) Disproof of spacetime and general relativity. *OSP Journal of Physics and Astronomy* 2.
4. Newton, I (1704) Opticks: A Treatise of the Reflexions, Refractions, Inflexions and Colours of Light.
5. Earman J., Glymour C (1980) Relativity and eclipses: the British eclipse expeditions of 1919 and their predecessors. *Historical Studies in the Physical Sciences* 1: 49-85.
6. Dyson FW., Eddington AS., Davidson C (1920) A Determination of the Deflection of Light by the Sun's Gravitational Field, from Observations Made at the Total Eclipse of May 29, 1919." *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 220: 571-581.
7. Hawking, S (1988) A Brief History of Time. *Bantam Books* 32.
8. Powell, D (2019) How the 1919 Solar Eclipse Made Einstein the World's Most Famous Scientist. *Discover Magazine*.
9. Joint Eclipse Meeting of the Royal Society and the Royal Astronomical Society (1919) *The Observatory: A Monthly Review of Astronomy* 42: 389-398.
10. Schneider P., Ehlers J., Falco EE (1992) Gravitational Lenses. *Springer*.