CHAPTER 2

GRT/PFGRT

With respect to this and the following chapters, in order to simplify the explanations, especially for the newcomer, the distinction between the measuring stick distance and the motion distance is ignored. Otherwise, the following discussions would be so complicated, that for the average individual, it would be too confusing to appreciate, moreover, understand.

2.1 Introduction to the Preferred Frame General Relativity Theory (PFGRT)

Chapter 1 established/hypothesized the existence of ether. Chapter 2 will demonstrate how the ether relates to gravity and the gravitational field. Nonetheless, the problem with Einstein's SRT is that it involves only linear inertial motion but not accelerated motion. Consequently, the dilemma with reference to the figures presented in Chapter 1 is that the dots portraying the galaxies generate their own gravitational fields. However, this fact was ignored. This is why the observers and astronauts (A, B, C) portrayed in those figures were generally, although not exclusively, positioned outside the influence of a gravitational field (outside of the galaxies). Furthermore, their own infinitesimal intrinsic gravitational fields were also overlooked.

So, where in the universe is there no gravitational field, resulting in acceleration? In the author's opinion, the answer is, most likely, nowhere. As a result, Einstein posited GRT. Now before proceeding, if the reader is not familiar with Einstein's GRT, the author recommends a perusal of Appendix B of this book, where it is explained in much greater detail. In addition, for the beginner, the following YouTube videos would be helpful.

https://www.youtube.com/ watch?v=fEZupmpTcOU-
It is titled "Einstein's General Theory of Relativity"

https://www.youtube.com/ watch?v=6XSAVqm0XBI-
It is titled "Einstein 100–Theory of General Relativity"

GRT is even less intuitive compared to SRT, since its assumptions are significantly more mathematical. So relative to SRT, it is even less visually perceptible. Additionally, with GRT, it is mathematics first; then we attempt to make pictorial sense of it. For that reason, it is exceedingly difficult for the nonscientist individual to comprehend. Regardless, the postulates of Einstein's GRT are presented below (from online *The Physics Hypertextbook*).

1. The absence of a gravitational field (true weightlessness) is indistinguishable from free fall acceleration in a gravitational field (apparent weightlessness).

2. Accelerated motion in the absence of a gravitational field is indistinguishable from un-accelerated motion in the presence of a gravitational field. The local effects of gravity are the same as those of being in an accelerating reference frame.

In other, moreover, simpler words, gravity and inertia are equivalent, then defined by Einstein as the equivalence principle. Subsequently, he used this assumption in conjunction with the two postulates of SRT: that with respect to all inertial reference frames, the laws of physics are identical, and second, the speed of light is (c) in empty space (= (c) relative to observer of SRT, regardless of observer velocity) to then create GRT. Essentially, GRT is an extension and modification of SRT.

2.2   Outcomes Associated with Einstein's GRT

So, by using GRT's basic assumptions, the following are 10 outcomes.

1. GRT posits that gravity is curved space–time (four-dimensional space-time).

2. GRT posits that gravity and inertia are equivalent (the equivalence principle).

3. GRT posits that due to the gravitational field, light is deflected or bent toward a large astronomical object. This function is defined as the gravitational lens affect.

4. GRT posits the existence of black holes, wherein the gravitational field is so intense that light cannot escape from its influence.

5. GRT posits that from the observer's reference frame, specifically located outside the gravitational field produced by a massive astronomical object, when a small object approaches that structure, then the object's inertial mass increases, its "rate of time" decreases, and for that object, distance/physical length in the direction of motion contracts.

6. GRT posits that from the reference frame of the observer, located outside the gravitational field produced by a massive astronomical object (star), he/she then perceives a delay of velocity of light as it travels from that star towards that observer. This is a function of a decrease in the rate of time, as well as changes in distance produced by the gravitational field (four–dimensional space–time). In addition, as light climbs out of the gravitational well due to energy loss, that light is redshifted.

7. GRT posits that while under the influence of a gravitational field, light waves undergo a redshift or blueshift.

8. GRT posits an advancement of the perihelion of Mercury's orbit, mathematically distinct, furthermore, more accurate, when compared to Newtonian physics.

9. GRT posits the concept of "frame dragging." This is where a massive, spinning astronomical object drags a minuscule portion of its nonrotating gravitational field/four–dimensional space–time (4–D S–T) into its own revolving motion.

10. GRT posits that gravity waves travel at (c).

2.3   Postulates Associated with the New PFGRT

So, exactly how does one modify the new PFSRT, as proposed in Chapter 1, in order to make it compatible with the assumptions and outcomes classically associated with Einstein's GRT? Here is the rationale. PFSRT as portrayed in Chapter 1 consists of, even though expanding, a static ether. In other words, the ether is motionless, and although it expands over time, it does not flow like a river.

Therefore, let us modify the PFSRT of Chapter 1 with three postulates presented below. For future reference, this modified PFSRT will be defined as the **Preferred Frame General Relativity Theory (PFGRT)**.

Postulate 1

Left	Right
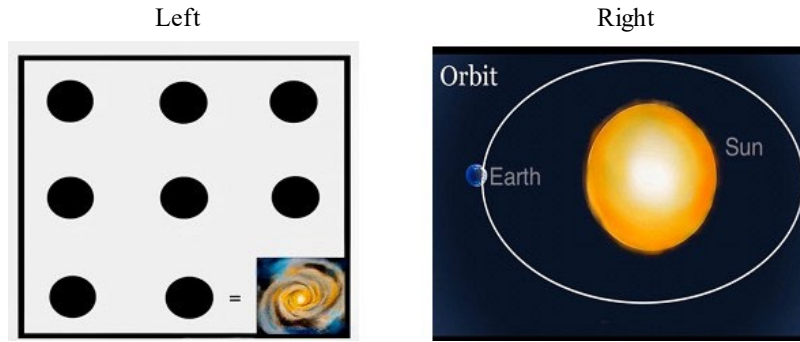
Credit: JCW

Figure 2.1   Left: Many galaxies (dots) and the ether (box); Right: Sun and the Earth

With reference to Figure 1.3 of Chapter 1 (PFSRT), let us remove all the galaxies symbolized by the dots (Left, Figure 2.1). In their place, presume only two astronomical objects: the Sun with the Earth orbiting it (Right, Figure 2.1). And so with respect to this hypothetical universe, there exists only the ether, the Sun, and the Earth. Next, let's focus only on the Sun.

Presuppose the ether (space) flows into the Sun as water flows into a sink but without rotation. See Figure 2.2 below.
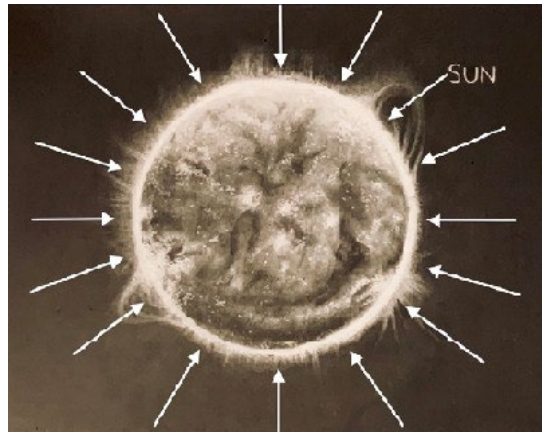
Credit: JCW

Figure 2.2   Inflow of Space or Ether

The arrows depict the inflow of space or ether (gravitational field) into the Sun. This is a two–dimensional representation of the gravitational flow of Newtonian–Lorentzian, inertial–electromagnetic space into all matter. The acceleration explains the ballistic effects of gravity; the velocity explains the electromagnetic (relativistic) effects. (From Physics Essays 25 online) [Credit: Lindner]

In other words, the ether of PFSRT, after entering into existence between the galaxies, resulting in the expansion of the universe, then flows, →without rotation←, directly towards, then into, matter (e.g., Sun) and subsequently disappears. Additionally, as it flows towards the Sun, it accelerates, stretches, and compresses. Take note: →The analogy to a sink is not totally appropriate, because as water flows into a sink, it can rotate and does not compress.

Even so, the comparison is useful for visualizing the concept←.

Postulate 2

The ether flows with a velocity/acceleration. Furthermore, it carries light (electromagnetic radiation) along with its own motion, comparable to how a river transports a wave with its own flow.

Postulate 3

Matter (object) interacts with the ether at a velocity or with force of acceleration (Scenario A). Contrariwise, the ether interacts with matter at a velocity or with acceleration by force (Scenario B). Both scenarios are referred to in much greater detail in the following figures and deliberations.

(Scenario A) See Figure 2.3.

When an object travels at a velocity relative to stationary ether (PFSRT), there is no resistance effect. On the other hand, if the same object is accelerated by force, again with respect to stationary ether, there is, in this case, a resistance (force) to its acceleration, furthermore, as a function of the ether.

The primary force (e.g., rocket) is exerted upon one side of the object, moreover, initially directed at its surface atoms. This force is then transmitted to the next internal adjacent set of atoms, then again to the following set, and so on and so forth. Essentially, this series of successive interactions occurs throughout the object in the direction of the force. For future reference, this function will be termed **(linear sequential acceleration = LSA)**.

Alternately, when compared to the direction of the primary force, the responding force of resistance derived from the ether is oriented in the opposite direction. Additionally, it is directed upon each atom separately within the object. This is because the ether occupies everything including the inner space of the object. In this case and for future reference, this latter concept will be termed **(individual atom resistance = IAR)**.

Therefore, as a function of acceleration, the object is compacted from both the initial/primary force (LSA) oriented in one direction and the responding resistance force on individual atoms derived from the ether in the opposite direction (IAR). This bidirectional interaction of two opposing forces is the definition of both inertia and inertial mass as already presented in Chapter 1 (PFSRT).
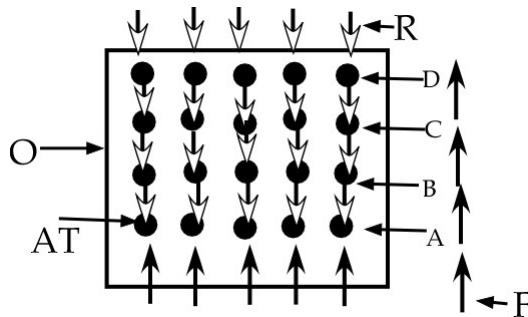

Figure 2.3   Picture of Inertia and Inertial Mass

- *The square box (O) symbolizes an object made up of atoms (AT).*
- *The solid black arrowheads (F) represent the primary force (e.g., rocket) directed upon the object's surface atoms initially from the bottom side of O, therefore, producing acceleration.*

- *This primary force, starting from the bottom side of the object, is then transmitted from atom to atom, in the direction of the force, to the other side of O. This successive series of interactions is portrayed by the vertical line of black arrows located on the right, from A to B to C to D (LSA).*
- *The hollow white arrows depict the responding force of resistance to acceleration (R) derived from the ether, moreover, acting on each atom separately within the object (IAR).*
- *Therefore, between the functions of the primary force and the resistance force, the object is then compacted.*
- *This is a pictorial representation of inertia and inertial mass.*
- *Bear in mind that two forces in opposition acting separately on each and every individual atom within the object would not result in its compaction. In order for compaction to occur, at least one of the opposing forces must be transmitted from its (object) surface atoms to adjacent internal set of atoms, to the next set and so on and so forth, through the object, from one of its sides to its other side (LSA).*

(Scenario B) See Figure 2.4 below.

When the ether flows at a velocity with respect to an object, there is no acceleration (force) effect. In contrast, if the ether flows with acceleration, relative to the same object, it acts upon, moreover, accelerates with force each and every atom separately within the object, now defined as **individual atom acceleration (IAA)**.

This is because, again, the ether occupies all of space, including the inner space of the object. So with reference to Scenario B as opposed to Scenario A, even though all the object's individual atoms are being accelerated, there is, in this setting, no compaction, as there is no opposing force (LSA). This unidirectional interaction represents geodesic motion (e.g., curved space–time). In addition, this is another way of perceiving exactly how a gravitational field produces an object's free–falling motion (Newton). Furthermore, it gives explanation to tidal forces, because the inflowing ether angles inwards towards a large astronomical object such as the Sun.
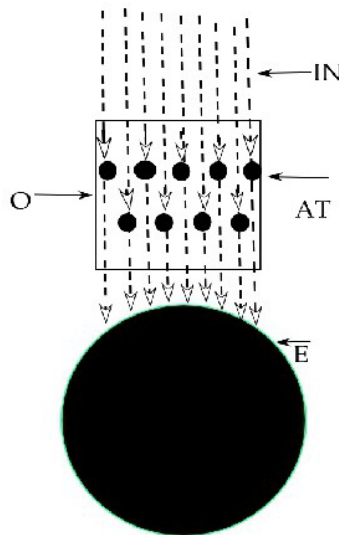

Figure 2.4   The Square = Free–Falling Object Towards Earth (Black Ball)

- *The vertical striped lines (IN) symbolize the inflow of space (ether) or in more–accepted terminology, the gravitational field. Note, the inflowing ether possesses both a →velocity factor← as well as an →acceleration factor (IAA)←.*
- *The large, black solid circle located at the bottom is the Earth.*
- *O is the object (hollow square) made of atoms (AT) = small black circles.*
- *The hollow arrowheads represent individual atom accelerations located throughout the object as a function of the inflow of the ether (acceleration force factor only) (IAA).*
- *Recall the →velocity factor← of the inflowing ether at the Earth's surface is equal to 11.2 km/sec. And at the same location, the →acceleration factor← of the inflowing ether is $9.8 m/s^2$.*
- *So, as a function only of acceleration of the inflowing ether (force) (IAA) but no corresponding opposing force (LSA), the object then is free–falling towards the Earth (weightless geodesic motion/curved space–time).*
- *This is also a pictorial representation of a gravitational field (Newton) producing an object's free–flowing motion.*

2.4   GRT vs. PFGRT

When compared to GRT, the new PFGRT exhibits many of the same outcomes. Even so, there are significant differences. Unlike GRT, PFGRT is much simpler, therefore, more comprehensible, since it is based on three–dimensional space rather than the mathematics of four–dimensional space–time. And for that reason, when compared to GRT, it is fairly easy to visually grasp. Furthermore, math is not involved, since it utilizes common sense logic based upon observations in the real world.

Listed below are the ten outcomes associated with **GRT** as already briefly offered in Section 2.2 but now explained in greater detail. Next, the same outcome, with reference to **PFGRT**, is presented using the new postulates. And finally, both the similarities, as well as the differences, are delineated **(GRT vs. PFGRT)**.

Again, the ten outcomes are listed below.

2.4.1. Gravitational field
2.4.2. Equivalence principle
2.4.3. Gravitational lens effect
2.4.4. Black hole
2.4.5. Inertial mass, rate of time, perception of distance in a gravitational field
2.4.6. Decreased in the speed of light in gravitational field
2.4.7. Redshifts, blueshifts in a gravitation field
2.4.8. The advancement of the perihelion of Mercury's orbit
2.4.9. Frame dragging
2.4.10. The speed of gravity

2.4.1. Gravitational Field

GRT

GRT defines a gravitational field as curved four–dimensional space–time (4–D S–T), the underlying reason an object moves towards a large astronomical structure, such as the Sun. The object moves towards the Sun not because there is a force, but rather, because curved space–time changes. Again, there is no force called gravity (gravitational field), only warped space. In other words, the object remains in inertial (geodesic) motion, but its trajectory is altered as a function of the distortion of space shaped by the Sun.

Fundamentally, GRT is a mathematical construct. For that reason, it is very difficult to picture in your mind a three–dimensional image that accurately illustrates the mathematics of

four–dimensional curved space–time, in fact, almost impossible. There are some analogies offered in the literature depicting a hypothetical small object orbiting another theoretical massive large body, the latter of which is located within a well, as pictured below in Figure 2.5. Nevertheless, the concept of time is not easily perceived relative to this two–dimensional figure of four dimensions.
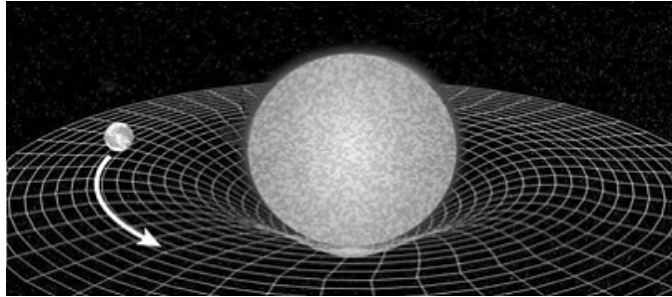
Credit: NASA

Figure 2.5   Bending Space–Time [Fair Use]

• *In general relativity, the warping of the geometry of space–time due to mass distributions accounts for the effects of "gravitational attraction." This principle allows one to replace the effects of gravity by equivalent effects based on the geometry of space–time.*

• *Once gravity is "abolished" in this way, and there is no "force of gravity," then all (gravitating) objects will have motions described by Newton's first law of motion. That is, those in motion will continue in a straight line at constant velocity. However, "straight line" now means only locally straight (locally parallel to a coordinate axis in space). The geometry of space is now "warped" (no longer Euclidean) in such a way that the object's actual trajectory is "similar" to that calculated in the classical way.*

• *Einstein wrote a field equation, which allowed the warping of the geometry of space–time to be calculated given a certain mass distribution. The trajectory of the moon around the Earth is locally straight in a space–time region warped by the presence of the Earth's mass. Such straight lines are called geodesics, defined as the shortest distance between two points in a curved space.*

• *Just as a bowling ball placed on a trampoline stretches the fabric and causes it to dimple or sag, so planets and stars warp space–time—a phenomenon known as the "geodetic effect." Thus, the planets orbiting the Sun are not being pulled by the Sun; they are following the curved space–time deformation caused by the Sun. (From online Cosmotography CCD Images of the Heavens)*

In addition, for the beginner, the following YouTube videos would be helpful.
https://www.youtube.com/watch?v=fEZupmpTcOU
Einstein's General Theory of Relativity
URL: https://www.youtube.com/watch?v=eGWIoSlCtEU

PFGRT
Alternatively, PFGRT presumes an object "falls" inwards towards the Sun because of the Sun's own inflow of space (ether), which then carries the object along with its own motion (acceleration factor only, IAA).

PFGRT vs. GRT
GRT underlying assumptions as to what constitutes a gravitational field differs considerably from PFGRT; nevertheless, the outcome is basically the same. GRT is mainly mathematical. In

contrast, PFGRT's inflow of space concept is visual, furthermore, strictly three–dimensional. And for that reason, when compared to GRT, it is relatively easy to comprehend.

2.4.2 Equivalence Principle GRT

GRT posits that inertia and gravity are equivalent; although the theory gives no underlying visual reasoning for why, it is only a mathematical relationship. Again, its postulates are listed below as found in *The Physics Hypertextbook*.

a. The absence of a gravitational field (true weightlessness) is indistinguishable from free– fall acceleration in a gravitational field (apparent weightlessness).

b. Accelerated motion in the absence of a gravitational field is indistinguishable from un- accelerated motion in the presence of a gravitational field. The local effects of gravity are the same as those of being in an accelerating reference frame.

http://physics.info/general–relativity.

(Figures 2.6 and 2.7 demonstrate this concept, Equivalence Principle.)

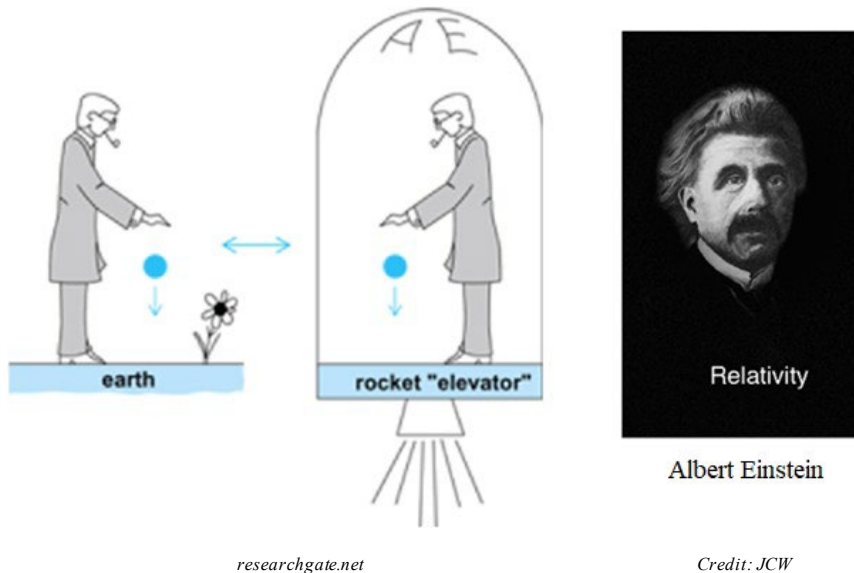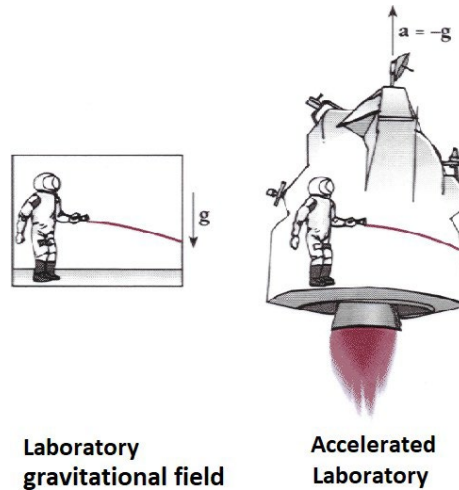*researchgate.net*   *Credit: JCW*

Figure 2.6   Equivalence Principle [Fair Use]

According to General Relativity, objects in a gravitational field behave similarly to objects within an accelerated enclosure. For example, an observer will see a ball fall to Earth provided that the acceleration of the rocket provides the same relative force. [Wikipedia]

http://psi.phys.wits.ac.za/teaching/Connell/phys284/2005/lecture-01/lecture _01/node17.html#warp

Figure 2.7   Equivalence of Bending Light (astronaut with flashlight) [Fair Use]

Special relativity is generalized to accommodate non–inertial reference frames. This is done via the principle of relativity. It is not possible to distinguish (in a closed system) between the effects produced by a gravitational field and those produced by an acceleration of the closed system. Note the curvature of the light beam with respect to both scenarios. (The Particle Solids Interactions Group, University of Witwatersrand)

The following YouTube site refers to the equivalence principle.
https://www.youtube.com/watch?v=2MquzTW5nq0

PFGRT

With reference to PFGRT as compared to GRT, the explanation for the equivalence principle differs considerably as the former is a visual description rather than mathematical. For example, please review Figure 2.8 with its hypothetical model containing the Sun, Earth, and ether. So now instead, imagine there exists only the box (ether of the universe) and the Earth. In essence, we eliminate the Sun, leaving only the Earth and the inflowing ether.

As posited by this new theory, the ether flows into the Earth as water into a sink without rotation, and then disappears. In addition, as it flows inward, it accelerates, stretches, and compresses. The velocity of the inflow at Earth's surface is the sum of all of the accelerations of the inflow, from infinity to the Earth's surface.

For that reason, the →velocity factor← of the inflow located at the Earth's surface is **11.2 km/sec**, and its → acceleration factor← is **9.8 m/sec^2**. Basically, this visual imagery is the equivalent to the definition of the Earth's gravitational field.
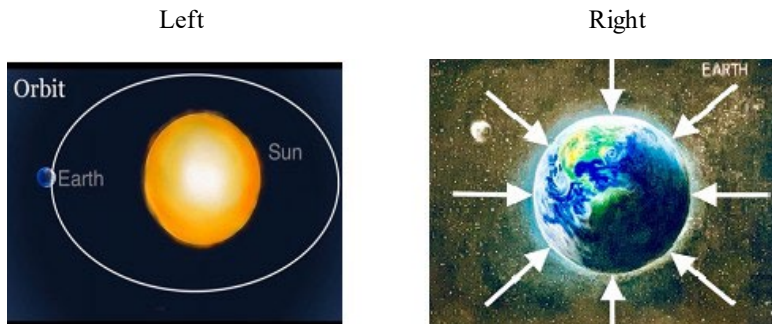
Left	Right

Credit:JCW

Figure 2.8   Sun (Left) and Earth (Right) Inside The Ether

Left: Square represents the ether of the universe containing only the Sun (S) and the Earth (E) orbiting it. Right: Inflow of space/ether into the Earth.

Therefore, given the assumptions and conclusions of PFSRT as presented in Chapter 1, combining them with postulates 1 through 3, Section 2.3 of this chapter, then the three–dimensional visual description for the equivalence principle is as follows.

Explanation 1

If an object, sighted far from the Earth where there is no flow of space (ether) is then accelerated by a primary/initial force (LSA) at 9.8 m/sec^2, it becomes compacted from the responding/opposing force of resistance produced by the ether exerted on the object's individual atoms (IAR) as explained in Postulate 3, Scenario A of this chapter. This bidirectional compressive interaction by two forces is the definition of inertia and inertial mass.

Explanation 2

Presuppose the same object is dropped from the very top of a steel tower, located 1,000 meters above the Earth's surface. Moreover, presume there is no atmosphere. And so, as a function of only the Earth's acceleration factor of the inflowing ether, each and every individual atom within the object is then being separately accelerated at 9.8 m/sec^2 (IAA).

However, in contrast to Explanation 1, there is now no compaction, because in this setting, there is no responding resisting/blocking force (LSA). In essence, the object is in geodesic motion or what is called "free falling motion in a gravitational field" as described in Postulate 3 Scenario B of this chapter.

Explanation 3

Presume again the same object is sited on the Earth's surface. Recall that the acceleration of the inflow at the Earth's surface is 9.8 m/sec^2. In addition, the accelerating factor of the inflowing ether (force) acts separately upon each and every individual atom within the object, analogous to Explanation 2 (IAA). However, in this setting, given that the object lies on the Earth's surface, the Earth then blocks its geodesic path with an opposing force (LSA).

As a result, for that object, compared to the direction of the inflow, there is then a **relative** acceleration oriented in the opposite direction away from Earth, moreover, against this inflowing ether frame. Consequently, the object is compacted from two forces just like Explanation 1 for inertia. However, now in this situation, this is the definition of gravity.

It is rather difficult to perceive that there is, in fact, acceleration from Earth. Therefore, picture this. Imagine that you are sitting on the Earth's surface, and adjacent to you, there is a

very large hole, within which you observe a functioning rocket, oriented in the direction away from Earth.

Envision that this rocket possesses an →internal thrust acceleration of 9.8 m/sec² ←. Observe, even in the face of the rocket's internal acceleration, it remains stationary with respect to you on the Earth's surface. This is because the acceleration factor of the inflow at the Earth's surface is also 9.8 m/sec² . However, when compared to the rocket's acceleration, it is oriented in the opposite direction. So if you think about it, relative to the inflowing ether frame, both you and the rocket are being equally accelerated away from Earth, one obvious, while the other not apparent. An analogous example is presented below in Figure 2.9.
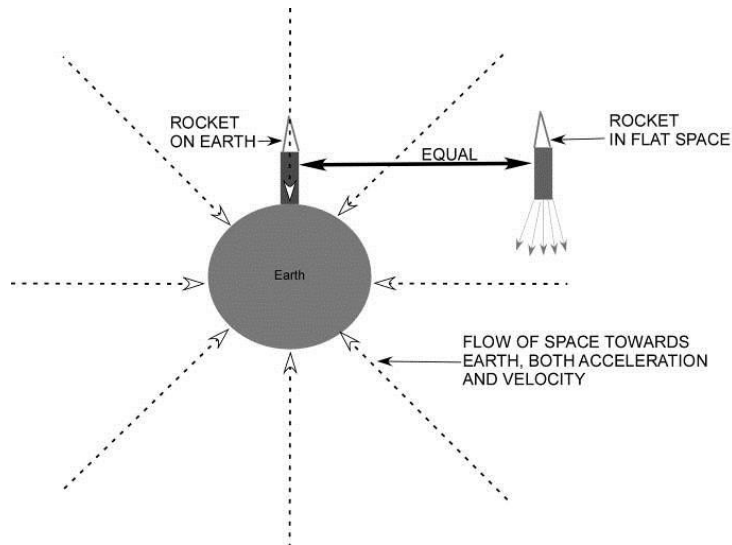

Figure 2.9   Equivalence Principle

- *Both of the above rockets have an acceleration of 9.8 m/sec².*
- *One is sitting quietly on the surface of the Earth with a **relative** acceleration, with respect to the inflowing ether, of 9.8 m/sec², therefore producing a responding resistance force from that ether frame.*
- *The other is located in flat space (outside of the influence of a gravitational field) with **a primary acceleration** force of 9.8 m/sec² (LSA), but this time, with respect to stationary ether, producing a responding force of resistance from that ether frame.*
- *They are equally compacted from two forces (acceleration and resistance), therefore equivalent.*
- *Now, even if the rocket sited on the surface of the Earth were functioning with an →internal thrust acceleration of 9.8 m/sec² ←, it would still remain stationary with respect to the Earth's surface.*
- *Again, this is the equivalence principle.*

Explanation 1 assumes the object is accelerated (LSA) at 9.8 m/sec² relative to stationary ether, then defined as inertia. Observe the primary/initial force of acceleration (LSA) is in one direction, and the responding resistance force produced by the ether (IAR) is in the opposite direction = compaction. *This is inertia.*

Explanation 3 presumes the same object is also accelerated (LSA, blocking Earth) at 9.8 m/sec², but in this case, **relative to the inflowing ether**, again with resistance (IAR) from that

same frame. Even so, it remains stationary on the Earth's surface. This function is then defined as gravity = again, compaction. *This is gravity*. **And so, gravity and inertia are equivalent**.

The author has found that the following subject matter is extremely difficult to describe, so one needs to really reflect in order to appreciate it. Given the fact that it is so complex, with reference to the following discussion, there is considerable redundancy. Hopefully, the many viewpoints presented will help the reader eventually appreciate this highly abstract topic. However, before proceeding, please take note of the symbols LSA, IAA, IAR, as well as the terms velocity factor/accelerating factor of the inflowing ether as defined earlier in this chapter (pages 36 through 46). One must understand the meaning of those symbols and terms before one can comprehend the following concepts. Now, assuming PFGRT can explain the strong equivalence principle as just presented above, then in order to be valid, it must also give explanation to the weak equivalence principle, as imparted below.

The weak equivalence principal:

"Gravity accelerates all objects equally regardless of their masses or the materials from which they are made. It's a cornerstone of modern physics" (NASA).

So here is the explanation, vis–*à*–vis the scenario, whereby there is a free-falling object (gravity), which subsequently impacts/strikes the Earth.

• Recollect that earlier in this chapter (pages 36 through 46), the inflowing ether frame has a →velocity factor← as well as an →acceleration factor←. The following explanation refers to only the acceleration factor, which has two basic functions/aspects as defined below. Additionally, at least for now, in order to avoid confusion and to simplify the explanations, the velocity factor will be ignored and dealt with at another time and place (see Appendix N).

• The accelerating factor of the inflowing ether frame (IAA, aka free–fall ether frame) acting alone, thereby producing a free–falling object, possesses two separate aspects/functions that are distinct but still interconnect with one another, the "**falling–force aspect**" (IAA*) (dependent on atomic weight) and the "**acceleration aspect**" (independent of atomic weight) (IAA**).

• For further clarity regarding a free–falling object, since the acceleration aspect of inflowing ether (space) (IAA**) acts equally and separately on all of the individual atoms, including atoms of different atomic weights within the object, moreover, →without a counteracting opposing force/resistance←, then objects of different atomic weights "free fall" at the same rate—the weak equivalence principle. So, for that object, no compaction transpires; the object is in geodesic/weightless/free–falling motion. Observe, with respect to this scenario, atomic weight has no effect on the rate of fall. See site *http://aether.lbl.gov/www/science/equiv.html*.

• For purpose of future reference, the letter A will characterize this concept.

• In contrast, the falling–force aspect (IAA*) exerted on those same atoms (falling objects) is a function of their atomic weights. Consequently, this force will vary, even though the accelerations are all the same.

• **Assume the resistance from the ether, which is a function of the acceleration of objects, relative to itself (ether) by an outside force (e.g., rocket/blocking Earth, LSA) as what produces inertial mass.** So, if there is no relative acceleration, there is no resistance = no compaction/inertial mass. And if there is no inertial mass, then the falling–force aspect (IAA*) will accelerate all objects (atoms) equally (→**because there is no resistance**←) independent of their different atomic weights; essentially, it transforms into the acceleration aspect (IAA**). This is now the falling–force aspect (IAA*) and the acceleration aspect (IAA**) interconnect (IAA = IAA+ IAA**). →They are actually two aspects of the same thing←. For this reason, again atoms of different atomic weights free fall at the same rate, but their falling forces will differ.

• In summary, given the assumptions just presented, picture a free–falling object in geodesic motion towards the Earth. The object's motion is a product of both the acceleration aspect (IAA**) and the falling–force aspect (IAA*), which are distinct, yet they still interconnect with each other (IAA = IAA* + IAA**). As a result, objects of different atomic weight free fall at the same rate, but their falling forces differ dependent upon atomic weight.

• It is only when a free–falling object strikes/impacts the Earth (blocking Earth = $F = ma$, LSA), therefore instantaneously accelerated (relative) against its own free–fall inflowing ether frame, that the opposing resistance from that same ether frame appears (IAA + IAR). So, at that time, the object becomes compacted, which is the definition of inertia and inertial mass.

• What is more, regarding this specific →free–falling object then impact on Earth scenario←, the relative acceleration (force) of the object against the frame of inflowing ether (LSA), inducing an opposing resistance from that frame (IAR, IAA* + IAA** = inertia), is in part, a function of atomic weight. In essence, the amount of resistance/compaction derived from **only** the inflowing ether frame (IAA) in response to acceleration of an object ($F = ma$, LSA) is the determinant factor for inertia/momentum.

• Again, for future reference, let's now label this second compaction perception by the letter B.

• Now, we'll weave all of this together in one imaginary perception: When an object (matter) free falls to Earth from the acceleration aspect of the inflowing ether (IAA**) without compaction (as there is no resistance), then conception A applies (IAA**). In contrast, when it strikes the Earth, instantly there exists a relative acceleration (force, LSA) of that object against the frame of the inflowing ether, what is more, with resistance generated by that same frame (IAR, IAA* +IAA**). And so, there is compaction (inertia) on impact. Now, concept B is apropos.

• Take notice that A (= no inertial mass) is unrelated to an atom's atomic weight, whereas B (= inertia) is contingent on atomic weight. Consequently, the more the overall atomic weight a free–falling object has and the more its velocity as it crashes into the Earth, then in response, the greater the resistance from that inflowing either frame (IAR, IAA* + IAA**) = increased compaction on impact (momentum).

• Essentially, when A (geodesic motion/curved space time/free fall) converts upon impact to B, then instantly, there exists a relative acceleration against the inflowing ether frame (LSA force); therefore, the responding resistance force emerges, derived from that same ether frame (IAR, IAA* + IAA**) = object becomes compacted as it strikes the face of the Earth.

• Regarding this specific scenario, what all this indicates is that the inertial mass of an object is only manifested when there is compression/compaction from two opposing forces; one of the forces transfers atom to atom from one side to its other side (LSA), while the other opposing force acts individually and separately on each atom within the object (IAR, IAA* + IAA**). Alternately, when acceleration/force is separately applied to each and every atom within an object (IAA**), without a corresponding opposite resistance/force, inertial mass is not apparent (e.g., free–falling object).

• →So, as above, the measure of resistance exerted on different objects (diverse atomic weights) being accelerated by an outside force (e.g., rocket/blocking Earth—LSA) from **only** the ether (IAR) is what produces differential inertial masses←.

• Viewed from another perspective, but with more detail, fundamentally, the compaction specifically of a →fallen object← or its inertia/momentum is a product of both the initial force (LSA), since the Earth blocks its geodesic path/motion and the opposing resistance/force from the inflowing ether frame (IAR, IAA* + IAA**) oriented in the opposite direction. Or, in other words, the relative acceleration of the object, against the frame of the inflowing ether,

thereby producing resistance from that frame = compaction (inertia). In contrast, if there is no compaction (geodesic motion/free–falling object), there is no inertial mass.

• → **Essentially, objects free fall at the same rate, because they possess no inertial mass (no compaction), but when they reach/strike the Earth's surface, inertia/inertial mass instantly becomes apparent (compaction)** ←.

• The following description is only to some extent analogous to this hypothesis; nevertheless, it does simplify the general idea. Presuppose that you are swimming in a river, and subsequently, you flow along with the river over a waterfall. During this downward motion with the water, you are not compacted, in fact, you are weightless. In addition, everything in your frame free falls at the same rate, independent of inertial mass (atomic weight). →This is A←. In this weightless state, you manifest no inertial mass. Next assume there is a large lattice that blocks your falling motion, it, nevertheless, still allows the water to pass through, so as you strike it, your motion changes; as such, you now possess relative acceleration (compaction, LSA) against the frame of the falling water (the falling water is →somewhat← analogous to the inflowing ether frame). Regarding this falling water compaction correspondence/scenario/analogy, you now possess inertial mass. →This is B dependent on atomic weight←.

In summary:

1. Inertia mass (inertia) is always associated with compaction, as is gravity.

2. In addition, the ether's acceleration aspect (AA**) acts equally on atoms of different atomic weights, even though the falling–force aspect (IAA*) varies as a function of atomic weight. As a result, diverse objects of different atomic weights free fall at the same rate; nonetheless, their falling forces will differentiate again dependent upon atomic weight.

3. Furthermore, it is the resistance explicitly from **only** the ether (IAR) to the acceleration of matter by an outside force = (LSA relative to itself [ether]) that gives rise to inertial mass—different atomic weights elicit different amounts of resistance as a function of **only** the ether.

4. So, if there is no inertial mass (resistance from the ether), then the falling force aspect (IAA*) will accelerate all objects (atoms) equally, independent of their different atomic weights; essentially, it transforms into the acceleration aspect (IAA**). This is how the falling force aspect (IAA*) and the acceleration aspect (IAA**) interconnect (IAA = IAA+ IAA**). →They are actually two aspects of the same thing←.

5. Again, for this reason (4), atoms of different atomic weights free fall at the same rate, but their falling forces will differ.

For a complete and much more extensive explanation, see Chapter 5, Section 5.6.11 (pages 273 to 278, Inertial Mass) as well as Appendix N.

2.4.3 Gravitational Lens Effect

Einstein's theory predicts that the direction of light propagation should be changed in a gravitational field. We have already seen a spectacular consequence of the deflection of light in a gravitational field: gravitational lensing. [Source: htpp://csep10.phys.utk.edu/]

Figures 2.10, 2.11, and 2.12 below portray this phenomenon.
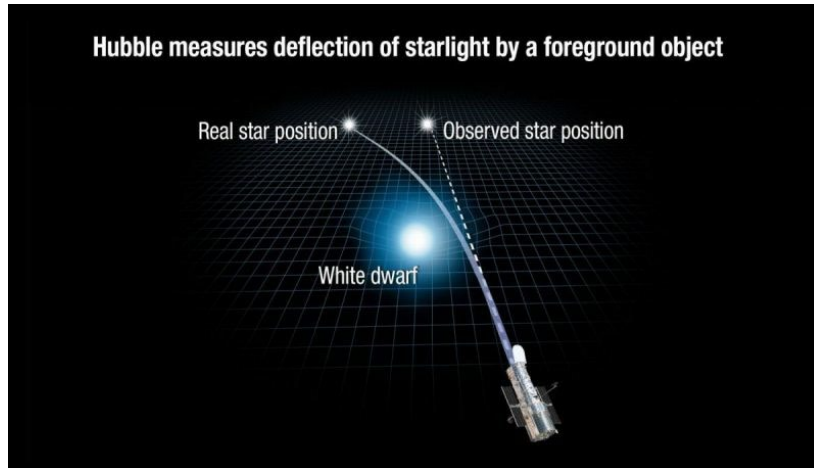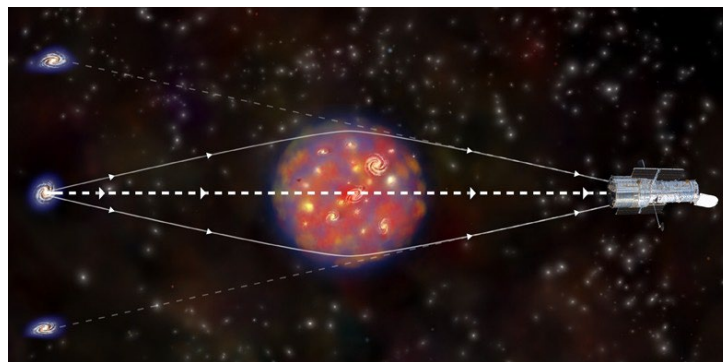

Credit: NASA

Figure 2.10 Space–Time Bends Light [Fair Use]

Figures 2.10 and 2.11 show the bending of light by a gravitational field (GRT) or in the lexicology used in this book, the inflow of space (PFGRT–ether).

The following YouTube presentations explain the gravitational lens effect:
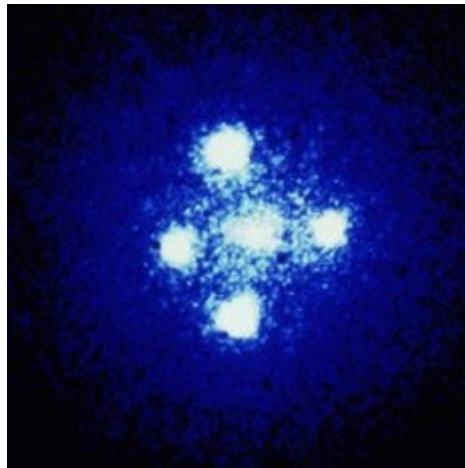
https://www.youtube.com/watch?v=H1bZcdE9zP0
https://www.youtube.com/watch?v=eGWIoSlCtEU

Credit: NASA

Figure 2.11 Bending of Light [Fair Use]

Wikipedia

Figure 2.12   Gravitational Lens (Einstein's Cross) [Fair Use]

The photograph is of four separate images of the same central distant galaxy! It appears as multiple images because the light is bent into four separate paths by the intervening lens (mass). (Science Blogs.)

GRT

GRT posits that light traveling tangential to the Sun's surface bends towards the Sun. The underlying cause for why is given by a mathematical equation that represents changes in the "rate of time" and distance. This is known by the phrase "four–dimensional space–time." It assumes there is no force called gravity, rather it is "space-time" that changes (warped space). And for that reason, light then shifts towards the Sun.

PFGRT

PFGRT also posits that light traveling tangential to the Sun's surface is deflected towards it. However, in this case, it is a function of the Sun's inflow, because this is what carries the light along with its own motion. This is similar to the way a river transports its waves along with its own movement. In addition, PFGRT posits that both the velocity factor and the acceleration factor of the inflowing ether transport electromagnetic radiation (light). In contrast, matter (object) is only affected by the acceleration factor of the inflowing ether. So what significance does this dichotomy then indicate? **Light is a part of the ether, whereas matter is separate from the ether.**

For that reason, this assumption means that even though light (c) travels faster when moving tangentially to a large astronomical object (e.g., Sun) compared to matter (< c), then, as a function of the inflowing space/ether, connected to that structure (velocity factor and acceleration factor), the light is deflected →per unit of time← more towards that object (electromagnetic effect = both velocity and acceleration) compared to matter (ballistic effect = only acceleration).

PFGRT vs. GRT

GRT utilizes four–dimensional space–time defined by Einstein as curved space–time to explain the Gravitational Lens Effect. This concept is extremely difficult to visualize, as it is almost purely mathematical.

Alternatively, PFGRT is a three–dimensional concept, therefore, fairly easy to imagine. In other words, both GRT and PFGRT predict, as well as produce, basically the same outcome. One is mathematical, while the other is visual. The most important factor to recognize is that PFGRT is considerably easier to comprehend (Occam's razor).

2.4.4 Black Hole
GRT

GRT posits that a black hole is a product of four–dimensional space–time, which is so powerful that it then curves back around upon itself. Consequently, light cannot escape from its influence. Please review Figure 2.13, which attempts to show the concept of four–dimensional space–time including a black hole. The lower schematic portrayed below is representative of a black hole. Observe it is difficult to illustrate four–dimensional space–time with respect to two–dimensions, especially the concept of space–time.
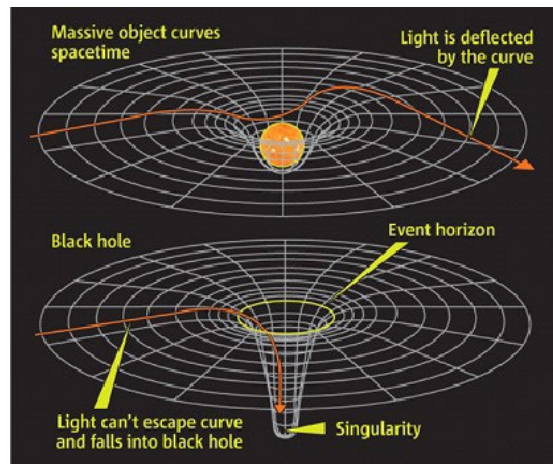
Young Scientists Journal Online
Courtesy of Caleb Scharf
www.nyas.org/publications/

Figure 2.13   Large Object vs. Black Hole Bending Space Time [Fair Use]

The effect of a mass on space and time is best illustrated by the analogy of an object placed on a rubber sheet. The object deforms the sheet just as a mass distorts space and time around itself (top).

A super–massive object, such as a black hole (a highly dense and compact mass), stretches the sheet so far that it becomes a fuel from within from which nothing can escape (bottom). [Source: www,nyas.org/publications/]

Alternatively, **PFGRT** posits that a black hole represents the inflow of space towards an enormous astronomical object at velocity of greater than (c). Therefore, light traveling at (c), moreover, in opposition, then cannot escape. See figures 2.14 and 2.15 below. Observe, this concept is easily comprehensible, moreover, clearly visualized. Note: This concept uses only the measuring stick distance.

GRT VS. PFGRT

Both GRT and PFGRT essentially produce the same outcome as pictured below in Figure 2.15. However, one is mathematical (GRT), while the other visual (PFGRT). Nonetheless, PFGRT is much easier to understand (Occam's razor).
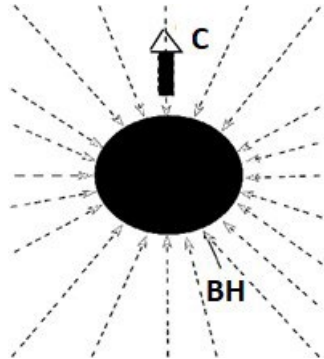
Figure 2.14   Light Trying to Escape

- *BH = black hole.*
- *The dotted lines portray the inflow of space >(c).*
- *The vertical single, thick black arrow depicts light traveling away from the BH at (c).*
- *As a result, light cannot escape.*

Wikimedia Commons

Figure 2.15   Light Cannot Escape [Fair Use]

Light cannot escape from a black hole. For that reason, there is a central void as pictured above. Both GRT and PFGRT produce the same result.

2.4.5 Inertial Mass, Rate of Time, Perception of Distance in a Gravitational Field

GRT

GRT postulates, from the frame of an observer located far from the Sun, that when an object moves closer to the Sun, its inertial mass increases, its "rate of time" slows down, and, for that object, distance/length in the direction of motion shrinks. Principally, GRT is a mathematical equation representing these conclusions. Nevertheless, other than math, the visual rationale for why this transpires is not apparent.

PFGRT

In contrast, PFGRT posits that as the ether inflows towards the Sun, it accelerates, stretches, and compresses. Remember, the velocity of the inflowing ether located at the Sun's surface is the sum of all of its accelerations, from infinity to the Sun's surface. Recollect as well, as presented in Chapter 1, that an object's resistance to acceleration by force derived from **only** the ether is what gives rise to inertial mass (LTF), the rate of time (LTF), and the perception of motion distance through space (ether).

Therefore, given all of the above, and with reference to the Sun, what happens to a small orbiting object, when its orbital radius suddenly contracts? Listed below: A, B, and C are those results.

A. When the orbital radius of the object decreases, relative to the Sun, its interaction with the velocity of the inflowing ether then increases. This is because, at that new location, there is an increased velocity/acceleration of the inflowing ether. For that reason, moreover, for that object, as a LTF, there is then an increased resistance to its acceleration by force–increased inertial mass.

B. In addition, while in orbit, the object also possesses a transverse velocity relative to the Sun's inflow. So as a function of being closer to the Sun, its orbital velocity relative to the inflowing ether then increases. In turn, as an LTF, this effect produces increased resistance again to its acceleration by force—increased inertial mass.

C. Furthermore, presupposing that the inflowing ether self-compresses (becomes denser) when it travels inwards towards the Sun, then as the orbital radius of the object diminishes, this third factor again produces a further increased resistance to acceleration by force. The denser the ether, the more the resistance from the ether, once again causing increased inertial mass.

In conclusion, linking them together, when an object's orbital radius contracts, its overall relative velocity with respect to the ether increases (A and B). In addition, at that new location, the density of the ether also increases (C). Therefore, for that object, all three functions then produce an increased resistance to acceleration by force once again increased inertial mass.

As such, overall, the object's inertial mass increases, its rate of time slows, and an observer located with that object →perceives← a decrease in motion distance to other objects. Furthermore, following the orbital contraction, the vibrating atoms within the object then slow down (rate of time). So, assuming light is emitted from that object, it is then redshifted.

As an aside, given the attributes of the inflowing space theory, an object's "time dilatation" (rate of time) when located inside a gravitational field (PFGRT) is a different process compared to an object's time dilatation as a function of its velocity relative to the ether of PRSRT. Essentially, time dilatation in a gravitational field (inflow of space) is related to three factors–compression (density), velocity, and possibly acceleration, whereas time dilatation relevant to flat space (PFSRT) is a function of only velocity (or relative velocity). Pertaining to PFGRT, acceleration is described as possible, because its only function may be that it gives rise to velocity. The following website refers to this hypothesis:

https://www.researchgate.net/post/

(Does acceleration affect the rate of a clock?)

GRT vs. PFGRT

Both GRT and PFGRT produce similar outcomes. However, PFGRT is much easier to visually comprehend, since it is not mathematical.

2.4.6 Decrease in the Speed of Light in Gravitational Field
GRT

Light slows down traveling in the direction away from a massive astronomical object such as the Sun. Why? GRT assumes that light slows down traveling from the Sun as a function of a decreased rate of time, as well as changes in distance (four–dimensional space–time).

Keep in mind, this perception is only from the frame of an observer position far from the Sun: a different reference frame. But if the observer is located in the same frame as the light, then its speed remains at (c). This theory is fundamentally a mathematical concept and very difficult to visualize.

Here is a citation describing this concept.

In GR, the speed of light is locally invariant, that is, if you measure the speed of light at your location, you'll always get the value of (c). However, if you measure the speed of light at some distant location, you may find it to be less than (c).

The obvious example of this is a black hole, where the speed of light falls as it approaches the event horizon and, indeed, slows to zero at the event horizon. The reason we may measure the speed of light at a distant location to be less than (c) is because space–time is curved by mass/energy. The coordinates that you use for measuring space–time will not match the coordinates a distant observer uses, and that's why the two of you measure different values for the speed of light. To calculate the speed of light at some distant point, you need to solve Einstein's equations to find out how space–time curves relative to your coordinate system. (From online Stack Exchange, Physics)

PFGRT

PFGRT also presumes that light slows down traveling from the Sun. However, in this case, it is due to the presumption that light travels at (c), against the inflow of the ether. Therefore, from the perspective of an observer located far from the Sun, it appears to travel towards him/her at a velocity <c. Again, this is because the inflow is in one direction, whereas the light beam travels in the opposite direction. It is comparable to the concept of a black hole as just described in the prior section, but in this instance, light is able to escape.

This concept is analogous to a boat traveling upon a river, as observed from a bridge located upstream that crosses that river. If the river is flowing at 10 mph downstream (inflow) while the boat is traveling at 30 mph upstream (c), then from the perspective of the observer, the boat appears to be traveling towards him/her at 20 mph (<c).

GRT vs. PFGRT

GRT's underlying assumptions as for why light slows down in a gravitational field differs significantly compared to PFGRT. Nonetheless, the outcomes are analogous. Once again, GRT is mathematical, whereas PFGRT is three–dimensional, and what's more, visual. Therefore, PFGRT is much easier to comprehend.

2.4.7 Redshifts, Blueshifts in a Gravitation Field GRT

GRT

Einstein's GRT posits that light traveling away from a strong gravitational field exhibits a shift to a lower frequency (redshift) as shown in Figure 2.16 below. GRT posits that the redshift is the result of the loss of energy of the electromagnetic radiation as it climbs out of a gravitational well. Conversely, it is blueshifted due to a gain in energy while traveling into a gravitational field.
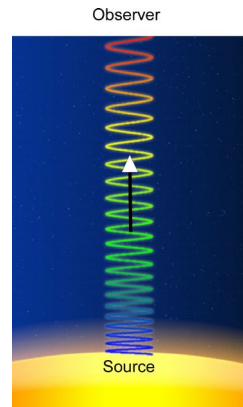
Wikimedia Commons

Figure 2.16   Gravity Inducing Redshift [Fair Use]

Redshift = longer wavelength; blueshift = shorter wavelength. Here is an intuitive explanation of frequency shift induced by gravity. While escaping it, light has to fight the gravitation field or force of gravity. Just as a stone thrown from the ground up into the sky loses speed or energy, light waves emitted from the surface and away from it must loose energy. And light rays happen to lose energy, not through lower speeds, but through lower frequencies or a shift toward the red frequency, which is lower than the blue frequency. http://gravimotion.info/gravity-frequency.php

PFGRT

As one peruses the following paragraphs, it will become apparent that this topic is extremely complicated, consequently lengthy. Most likely it will be difficult for the average individual to comprehend.

Nevertheless, the author will attempt to make the explanation as simple as possible. PFGRT also postulates that light emitted from an object located close to the Sun appears redshifted from the perspective of an observer positioned far from the Sun. This is because the number of wavelengths per second observed at that location decreases (redshift) since light travels <c (c minus the inflow of space) as presented in the prior section. In addition, given that the inflow stretches as it accelerates towards the Sun, then light traveling against the inflow also stretches, so again redshifted for the observer far from the Sun. Furthermore, photons emitted from the vibrating atoms of an object located close to the Sun are associated with a slower rate of time relative to the observer far from the Sun, so once again redshifted from the perspective of the observer sited far from the Sun.

In conclusion, regarding this description now defined as Scenario 1, the redshift of light as observed far from the Sun for light emitted from an object located close to the Sun is a function of:

1. The perceived velocity <c, (c minus the velocity of the inflow); thus, the number of observed wavelengths per second decreases (redshift).

2. The stretching of the inflowing ether as it accelerates in towards the Sun (redshift).

3. And finally, the **relative** slowing of the rates of time, emitter slower than the observer (redshift). So, regarding Scenario 1, the overall number of wavelengths perceived by the observer per second, then decreases when compared to the emitter.

Conversely, light is perceived as blueshifted relative to an observer located close to the Sun with respect to light emitted from an object positioned far from the Sun, now defined as Scenario 2. This is a function of:

1. The velocity of light is greater than (c) (c plus the velocity of the inflow). Consequently, the number of wavelengths perceived by the observer per second increases (blueshift).

2. There is a relative increase in the rates of time, emitter faster than the observer; therefore, the number of wavelengths per second perceived by the observer increases (blueshift).

3. However, with respect to Scenario 2, as opposed to Scenario 1, take note of this. The inflowing ether stretches as it accelerates towards the Sun. Consequently, with reference to this specific function and only this function, electromagnetic radiation traveling both to and from the Sun is stretched in both directions, **accordingly redshifted in both directions**. This means that with respect to this blue versus redshift model, light emitted from an object close to the Sun as observed far from the Sun (Scenario 1) is not anti–symmetrical with respect to light emitted by an object located far from the Sun as observed from close to the Sun (Scenario 2).

4. Even so, with reference to Scenario 2, the overall number of wavelengths perceived per second by the observer still increases (blueshift).

This model is extremely complex. Therefore, for reinforcement, it will now be reexplained from a different perspective. This concept is considerably easier to understand if analyzed from the perspective of only the observer, comparable to Einstein's SRT/GRT. So, with respect to this specific concept, imagine it from the perspective of only the observer as now summarized below.

Scenario 1 is from the observer's perspective, located far from the Sun (right side), relative to a light beam emitted from an object close to the Sun (left side). This scenario is depicted in Figure 2.17 below, moreover, with a following summary.
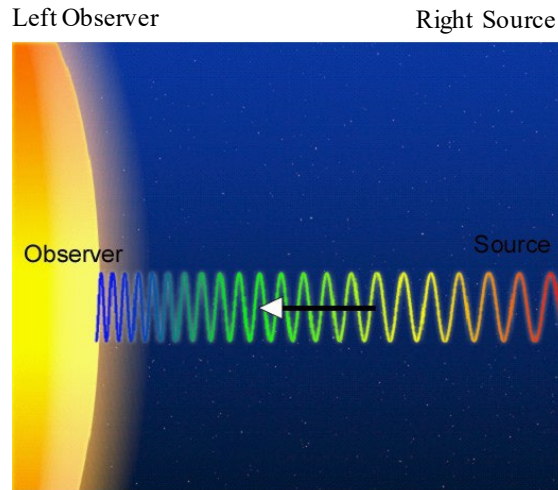
Left Source   Right Observer
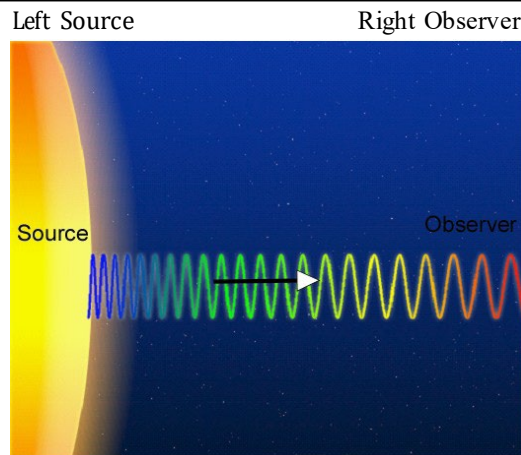
Wikimedia Commons

Figure 2.17   Redshift [Fair Use]

- *Decrease in the speed of light $< c$ (c- the inflow) = redshift.*
- *Relative slower "rate of time" of the emitter (left) compared to the observer (right) = redshift.*
- *The stretching of accelerating inflowing ether (space) = redshift.*
- *Overall, there is a redshift.*

Scenario 2 is from the observer's perspective located close to the Sun (left side), relative to a light beam emitted from an object (right side) positioned far from the Sun. This concept is shown in Figure 2.18 below–again with a following summary.

Left Observer   Right Source

Wikimedia Commons

Figure 2.18   Blueshift [Fair Use]

- *Increase in the speed of light $> c$ (c + the inflow) = blueshift.*
- *Relative faster "rate of time" of the emitter (right) compared to the observer (left) = blueshift.*
- *The stretching of the inflowing ether = redshift.*
- *Overall, there is still a blueshift.*

Essentially, the specific function of the stretching of the inflowing ether in both directions, to and from the Sun, produces a redshift of light in both directions, which is actually a loss of energy. So overall, considering all the functions, the energy loss of the outgoing light wave from the Sun is greater compared to the energy gain of the incoming light wave directed towards the Sun.

Scenarios 1 and 2 are not anti–symmetrical, in view of the fact that the stretching of the inflowing ether produces a redshift of light in both directions, whether traveling to or from the Sun.

GRT vs. PFGRT

GRT posits that light travels from the Sun at $< c$, as observed far from the Sun because "time" slows down and distance decreases the closer to the Sun (four–dimensional space–time).

But most importantly, this perception occurs only as observed outside that increasing gravitational frame. In addition, it presumes light loses energy as it travels against the gradient of a gravitational field. Recall, the longer the wavelength, the less energy. Of course, then, light traveling inwards towards the Sun is the converse.

In contrast, PFGRT pictures the underlying physical mechanism whereby they are connected, not with math, rather visually with respect to three–dimensional space (ether). Both GRT and PFGRT produce somewhat similar outcomes. Both theories are complex, one mathematically (GRT), the other visually (PFGRT). Perhaps with time, they can be tested with new observations along with experiments. Then, eventually, either one could be corroborated with

a rigorous mathematical proof. Yes, in the final analysis, math is absolutely necessary for confirmation of any given theory. Nevertheless, it should not be the primary driving force for the theory.

Bear in mind, as a speculation and only a conjecture, presupposing all of that presented above is germane (PFGRT), then reflect on this. There are unsolved mysteries rewarding present-day cosmology. First, this includes the anomalous increased peripheral rotational rate of galaxies, the unexplained increased gravitation lens effect, and the formation of the large-scale cosmic web-like structure of the universe. Physicists hypothesize dark matter as an explanation. And second, → over time←, there is the observation of an inexplicable increasing rate of expansion of the universe. In this instance, as a cause, physicists theorize dark energy. Then again, there is another option: The inflowing space/ether theory (PFGRT) with its associated redshifts is an alternative premise relevant to those aberrant observations (compared to the expectations of Newtonian mechanics).

For instance, PFGRT may not exactly correspond to Newton's gravitational theory applicable to the large-scale matter structures of the universe. This is due to the proposition regarding PFGRT, that there is an overall loss of space/ether located about matter (galaxies/super-clusters of galaxies, etc.), given the idea that space/ether flows into matter and then vanishes. As such, PFGRT could give rise to a different hypothesis vis-á-vis the observed incongruities as depicted above, instead of being attributed to dark matter.

And as for dark energy, →over eons←, as matter coalesces/contracts into the large-scale cosmic web-like pattern of the universe (progressively larger and denser clumps/webs of matter), then as observed from Earth, there would be a **relative** increased redshift of light generated from galaxies, located within a web close to Earth, as compared to other galaxies sited in different webs positioned far from Earth. furthermore, this form of gravitational redshift (inflow of space) would be superimposed upon the redshift of expanding space—Hubble constant (distance from the observer on Earth).

This is because, for the former (not the Hubble constant), the ether stretches as it flows into matter (thus a redshift of light emitted from a large astronomical object). And second, this phenomenon is also because, with reference to light, there is an intensifying redshift whenever it is generated close to/within increasing vast amounts of matter versus light sourced from lesser amounts of matter. Light emitted from enlarging/merging galaxies, which are located within the ever-concentrating cosmic webs, will exhibit over eons an ever-increasing redshift as a function of an ever-strengthening gravitational field.

Viewed from another perspective, →over time←, as the cosmic web-like pattern of the universe continually forms/contracts, the greater then is the overall density of matter within in that coalescing structure (strengthening gravitational influence). In turn, light emitted from galaxies (matter) sited within that changing configuration will show, → again over time←, an increasing redshift, more pointedly, not a function of distance from the observer on Earth (ballooning space—Hubble constant).

And so, from our reference frame on Earth, the observed redshift of light from galaxies is a function of the following:

1. The distance from Earth, as an effect expanding space, (the voids of the ballooning ether) located between the webs—e.g., Boőtes void). Once again this is the Hubble constant.

2. Over time, the increasing density/coalescence of matter into the formation of the cosmic web-like structure of the universe, a product of inflowing space/ether (PFGRT) into matter (e.g., galaxies, etc.) whereby space/ether then disappears. This is similar to, but not exactly like, Newton's gravitational theory.

So in summary, light emitted from galaxies positioned close to Earth, sited within the webs, is associated with a greater →**relative redshift**← (not taking into account the expansion of space) compared to light generated from other galaxies located far from Earth, again within the webs (further back in time). Furthermore, this function is not based upon distance from Earth but rather from the intensifying redshift gravitational effect related to the coalescing/denser webs of matter (e.g., galaxies) that occurs over time. This outcome would then **mimic** dark energy **as observed from Earth**.

In addition, as an assumption of functions 1 and 2, as we (observer on Earth) look out into the universe, →back in time←, the Hubble model is not a straight-line constant (mathematical function) nor for that matter, perhaps not even a constant at all. Also, the inflowing space theory (PFGRT) clarifies why there is no local expansion (our galaxy and the local group of galaxies). This is because close by we exist within one local cosmic web-like structure consisting of inflowing space/ether into matter where it subsequently vanishes (PRGRT). One more time, this premise is somewhat but not exactly like Newton's gravitational theory, which holds the local group of galaxies together since it counteracts the expansion. What is more, we are not located within the expanding bubbles of empty space/ether.

Finally, the author poses this question. Given all that as just described above, does the minimal variation detected in the cosmic microwave background radiation (1 to 1,000,000, refer to Figure 1.13) epitomize what occurred, →back in time←, at the origin/beginning of the universe, or is it a function of its large-scale, web-like structure but now observed →presently← from our local reference frame on Earth, or possibly even both?

For a video review of the classic modern theory of cosmology, →not the author's theory← (PFGRT), please refer to the websites provided below, vis-à-vis the development over time of the large-scale, web-like structure of the universe.

HubbleSite: Video - Cruising the Cosmic Web, V2 (Dome Version)

Large-scale Structure of the Universe - Bing video

(119) Formation of Large-Scale Structure in the Universe (Intro Astronomy module 14, lecture 6) - YouTube See especially starting at about 19 minutes 30 seconds

2.4.8 The Advancement of the Perihelion of Mercury's Orbit

Figure 2.19 below portrays the advancement of the perihelion of Mercury orbit. Following the figure, there is a quote explaining this phenomenon.

Mercury's Orbit
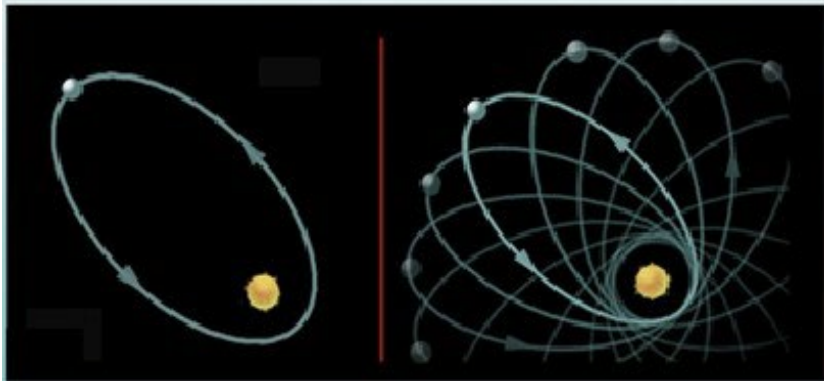
Phys. Rev. D, open access

Figure 2.19   Mercury's Perihelion Advance [Fair Use]

This is an artist's version of the precession of Mercury's orbit. Most of the effect is due to the pull from other planets, but there is measurable effect due to the corrections to Newton's theory predicted by the General Theory of Relativity. [http://physics.ucr.edu/ ˜wudka/Physics7/Notes-www/nod e98.html]

"The orientation of Mercury's orbit is found to precess in space over time, as indicated in the above figure (the magnitude of the effect is greatly exaggerated for purposes of figure). This is commonly called the 'precession of the perihelion,' because it causes the position of the perihelion to move around the center of mass. Only part of this can be accounted for by perturbations in Newton's theory. There is an extra 43 seconds of arc per century in this precession that is predicted by the Theory of General Relativity and observed to occur (recall that a second of arc is 1/3600 of an angular degree). This effect is extremely small, but the measurements are very precise and can detect such small effects very well." (University of Rochester, Department of Physics and Astronomy)

See the YouTube presentation of this subject:

http://physics.ucr.edu/   ˜wudka/Physics7/Notes-www/nod   e98.html

GRT

One major celebrated proof of Einstein's GRT is that it gives explanation to the advancement of the perihelion of Mercury's orbit more precisely compared to Newtonian physics. GRT's explanation for the advancement of the perihelion of Mercury's orbit is mathematical, as it involves changes in rate of time and distance (four–dimensional space–time), thus very difficult to mentally visualize.

PFGRT

PFGRT is compatible with Mercury's true orbital mechanics as well. This concept is also somewhat difficult to mentally visualize. Even so, this concept is to some extent pictured in Figure 2.20 below. Furthermore, it is explained in the following passages.

Mercury's orbit is proportionally more elliptical compared to the Earth's orbit. As a result, during perigee, when it moves closer to the Sun, it then transverses through more condensed space (ether). This is because the inflow of space compresses as it inflows towards the Sun. So, during this interval, it then advances its orbit relative to Earth's orbit. Again, this is because it is traveling through denser space **compared** to that of the Earth.
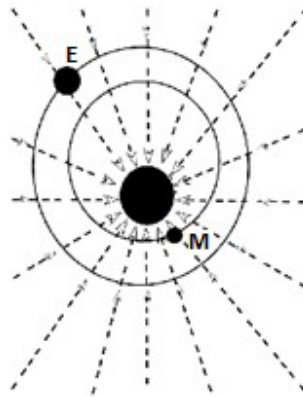

Figure 2.20   Mercury's Orbit vs. Earth's Orbit

- *The dotted arrows represent the inflowing space or the inflowing ether.*
- *M = Mercury with its elliptical orbit.*
- *E = Earth with its more circular orbit.*
- *The central black circle is the Sun.*

Nevertheless, Mercury's orbital advancement cannot be readily observed from Earth until it reaches apogee, whereby the ether is less compressed. As a result, over time, during its many orbits, it will eventually advance its perihelion, relative to the observer located on Earth more accurate than by using Newtonian orbital physics alone, just like GRT.

GRT vs. PFGRT

Both GRT and PFGRT conceivably can produce the same outcome. Both are complex, one mathematically (GRT) and the other visually (PFGRT). Perhaps in the future, they can be tested by observation with a corresponding mathematical proof. Yes, again, we need math.

2.4.9 Frame Dragging

A pendulum placed in motion at one of the Earth's poles appears to rotate 360 degrees every 24 hours. Superficially, it appears that way. However, in reality, it is not the pendulum that is

rotating; rather, it is the observer. This is a function of the pendulum's conservation of momentum with respect to the nonrotating gravitation field. What does this signify? This indicates that the inflowing ether, or expressed in more accepted terminology, the earth's gravitational field, →does not rotate, to any significant degree←, along with the garth's axial spin.

GRT

GRT posits frame dragging. As a result, the Earth along with its axial rotation, then drags a minuscule portion of its nonrotating gravitational field (4–D S –T) into its own revolving motion. Essentially, frame dragging, if genuine, is infinitesimal, but perhaps not quite immeasurable, given that Gravity Probe B, supposedly, as hypothesized, proved its existence. So, assuming Gravity Probe B's results are correct, then frame dragging is real. Figure 2.21 below portrays an exaggerated image of frame dragging.
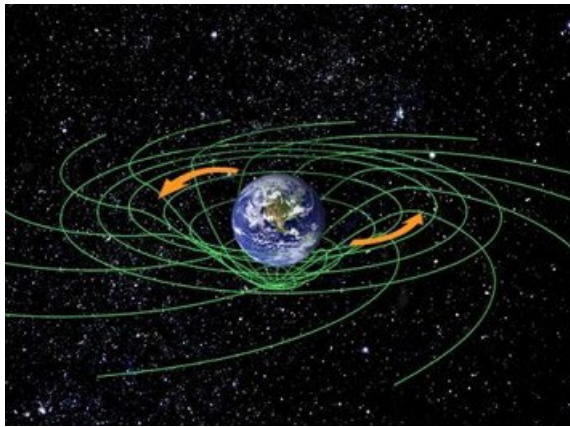

Figure 2.21   Frame Dragging [Fair Use]

This artists' conception–by copyright holders James Overduin, Pancho Eekels and Bob Kahn–depicts the probe's findings.
Online via NASA; fair use for educational purpose.

Figure 2.21 portrays an exaggerated image of frame dragging. A NASA space vehicle, known as "Gravity Probe B," has measured the curved space–time around the Earth. The principal investigator of the probe's mission was Stanford University's Francis Everitt, who said, "The space–time around Earth appears to be distorted just as General Relativity predicts." [Source: NASA]

PFGRT

In contrast, PFGRT does not posit this phenomenon, though it does not completely rule it out since it is so minute. If you think about it, if the nonrotating inflowing ether (gravitational field) flows in to rotating matter, su ch as th e Earth, then it is difficult to believe the re is not at least some effect. Even so, this concept is not posited with respect to PFGRT.

GRT vs. PFGRT

PFGRT is not consistent with frame dragging, whereas GRT predicts it. As a tangent, the →nonrotating inflowing ether← (EGF ECF) is also the local preferred inertia on Earth. So again gravity and inertia are equivalent. As such, this gives explanation to Newton's rotating bucket argument/experiment (RBA, RBE), whereby he posited acceleration of the RBE relative to an entity, termed absolute space.

See the two websites below for a full visual demonstration and explanation.

1. *https://en.wikipedia.org/wiki/Bucket-argument*
2. *https://www.yout.com/watch?v=Toy4T9WMS9U*

After viewing these two websites, here is the author's alternative explanation/postulate for the outcome of Newton's RBE.

A. The →nonrotating inflowing ether← ECF/EGF resists acceleration of matter (object), including its angular acceleration, therefore, for the later, producing centripetal/centrifugal forces. In contrast, the ECF/EGF/ether does not resist an object's translational velocity nor its angular velocity.

B. In other words from the perspective of Earth's surface, as a function of the Earth's axial spin within the ECF/EGF inflowing ether, there is then a relative ether wind. Basically, the RBE possesses a transverse/translational velocity with respect to the ECF/EGF given the fact it travels along with the rotating Earth's surface.

C. The acceleration effect of the RBE was perceived by Newton to be related to a fixed frame (absolute space). However, his postulate was in erratum. Again, this is because the nonrotating inflowing ether (ECF/EGF) does not resist the RBE's translational velocity as it travels in synchrony along with the rotating Earth's surface, nor does it resist its angular spin velocity. But at the same time, it does resist its angular acceleration, accordingly, generating centrifugal/centripetal forces.

D. Fundamentally, although not readily apparent, the acceleration effect of the RBE is relative to the ECF/EGF/inflowing ether, which like Newton's absolute space idea is a non–rotating fixed frame. Nevertheless, the ECF/EGF is not the absolute space frame as posited by Newton.

E. So given all the above, then vis–*a′*–vis the RBE, its angular velocity/translational velocity relative to the ECF/EGF is not apparent. Only the function of its angular acceleration with respect to the ECF/EGF remains.

F. That is to say, regarding the outcome of the RBE, moreover, as a consequence of this dichotomy, the remaining perception of acceleration relative to the ECF/EGF, then mimics Newton's idea of absolute space.

G. Discern this new theory is in conflict with the Mach principle, whereby acceleration and inertia are related to the sum total mass of the universe.

2.4.10 The Speed of Gravity GRT

GRT posits that the speed of gravity (gravity waves) is (c), since absolutely nothing can travel faster. This is a basic assumption. Moreover, it is a part of the mathematics of GRT. GRT hypothesizes that mass curves space–time at velocity (c) moving spherically outward from a large astronomical object such as the Sun, as illustrated below (Figure 2.22). Furthermore, that curved space–time then tells mass (Earth) how to move.

When the Earth orbits, curved space–time generated from the Sun is already in place. Therefore, the interaction of the Earth with curved-space (warped space) is always oriented at a right angle directly towards the Sun. For that reason, even though gravity waves travel at (c), as a sphere traveling outward from the Sun, the gravitational effect by the Sun on Earth only appears (not real) instantaneous (right angle).
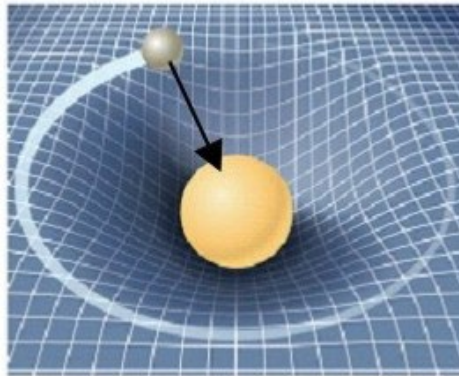
University Physics, Authored by: OpenStax CNX

Figure 2.22 Curved Space-Time [Fair Use]

- →*Curved space–time travels* at (c) *outward from the Sun← and the Earth orbits this preplaced warped space at a right angle as shown above. Consequently, this function only gives the appearance of an instantaneous pull affect (not real).*

- *Central mass = Sun; orbiting mass = Earth.*

- *For reinforcement, as shown above, when the Earth orbits, curved space–time generated from the Sun is already in position. Notice the interaction of the Earth with curved space is always at a right angle (see arrow in Figure 2.22) directly towards the Sun. Therefore, even though gravity waves travel at (c), as a sphere outward from the Sun, the gravitational effect by the Sun on Earth still appears instantaneous, just like Newtonian physics.*

A visual presentation of this hypothesis can be found at "What is Gravity? – Newton vs. Einstein."

https://www.youtube.com/watch?reload=9&v=6cE1PKXj1dU

PFGRT

In the same manner PFGRT assumes the speed of gravity (inflowing ether), it has only the superficial appearance of being instantaneous. For example, imagine hypothetically, that the Sun with its surrounding inflowing ether (gravitational field) consists of a perfect sphere. In addition, for purposes of this analogy, visualize that the Earth, relative to the Sun is in an absolutely circular orbit. Therefore, the Earth in orbit then intersects/interacts with Sun's preplaced inflow at **a right angle** towards the Sun. In essence, the Sun's inflow acceleration action exerted on the Earth at a right angle appears instantaneous, just like Newtonian physics, even though, in fact, it is not.

This analogy is not totally germane in terms of the true shape of Earth's orbit or the actual three–dimensional configuration of the Sun with its gravitational field. But it does explain the concept.
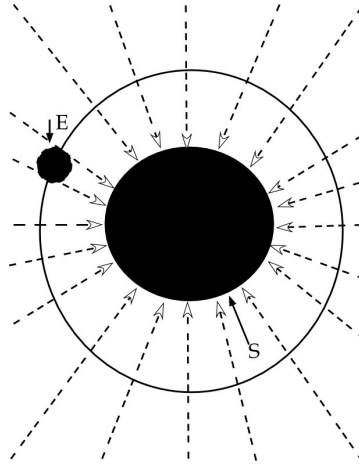
Figure 2.23 Earth's Path is Perpendicular to Inflowing Ether

Central mass = Sun; orbiting mass = Earth
- *E = Earth.*
- *S = Sun.*
- *Dotted lines = Sun's inflow of space or ether into the Sun.*
- *Hollow circle = Earth's orbit.*
- *The Earth in its orbit intersects with the Sun's inflow always at a **right angle**.*
- *This has the appearance of an instantaneous gravitational effect even though it is not.*

GRT vs. PFGRT

Regarding GRT and PFGRT, as just described, both so–called "gravitational effects" appear instantaneous, even though, in fact, that is not true. Fundamentally, both curved space–time, as well as the accelerating inflowing ether, generated by the Sun are prepositioned at a right angle relative to the orbiting Earth.

Therefore, the so–called gravitational interaction appears instantaneous, but in erratum.

2.5   Entrainment

GRT does not postulate entrainment.

PFGRT is only somewhat analogous to the concept of ether entrainment. For instance, assuming the nonrotating inflowing ether represents the gravitational field in today's vocabulary, then large astronomical objects such as the Sun or Earth carry that inflow along with their own motion. This is a form of ether entrainment, but it is not the classical static concept, since there is an inflow.

PFGRT vs. GRT

GRT presumes entrainment does not exist. PFGRT presumptions are somewhat analogous to the concept of classic entrainment.

2.6 The Earth–Centered Frame / Earth's Gravitational Field/The Preferred Frame (GRT vs. PFGRT)

GRT

GRT assumes the speed of light is (c) relative to the observer (c constant in empty space), but all is not that simple (see further explanation below).

PFGRT

Assuming the Earth–centered inertial frame ECF/the Earth's gravitational field EGF/the Earth's inflow of space is the local preferred frame for the speed of light (c), then relative to the observer, the speed of light is not always perceived as (c).

For example, by definition, PFGRT assumes that the ether flows inwards towards the Earth. In addition, light travels within it at (c). This is the local preferred frame for light on Earth. Therefore, an observer located adjacent to Earth, viewing light traveling towards him/her, moreover, straight to the Earth, perceives its velocity as (c) plus, the velocity of the inflow at that location. Conversely, an observer who is positioned far from the Earth, viewing light traveling directly from Earth, moreover, straight towards him/her, perceives its velocity as c-minus, the velocity of the inflow at that locality.

In combination with the above postulates, and again, assuming the nonrotating inflowing ether/the gravitational field is the preferred frame for the speed of light, then any observer traveling at a transverse velocity relative to this frame also perceives the speed of light as (c) plus or minus his/her velocity relative to that radial frame. As an aside, the author does not know whether or not the density of the ether affects the speed of light.

Therefore, assuming PFGRT (gravitational field of Earth) is the local preferred frame for the speed of light, then the speed of light is not in all cases equal to (c) as perceived from the frame of the observer.

GRT vs. PFGRT

This specific comparison is very abstract. Therefore, in the author's opinion, it will be challenging for the average individual to grasp the following concept.

GRT posits that, relative to the observer, the speed of light within a gravitational field is (c). However, this only occurs if both are located inside the same accelerated frame. In contrast, an observer located in a different frame, viewing light traveling through that other frame can perceive the velocity of light as other than (c). Again, strickly speaking, the observer of GRT views the speed of light as (c) **within** all accelerated reference frames, but only when both the light and the observer are located in the same reference frame.

Alternatively, PFGRT presumes the speed of light is relative to the gravitational field (EGF), or expressed in other terminology, The Earth–centered frame (ECF), nonrotating inflowing space, and nonrotating inflowing ether. Therefore, as a function of this assumption (EGF/ECF), then from the perspective of the observer, the speed of light is not always perceived as (c).

So which theory is simpler? What's more compatible with actual reality? Listed below is that answer. There are four observations and/or experiments explained supporting ECF/EGF/PFGRT.

1. The global positioning system (GPS) uses only the Earth–centered frame as the preferred frame for the speed of light, not the observer's frame.

2. NASA, when communicating by radio waves from Earth with deep solar system space probes, uses only the Sun–centered frame analogous to the ECF as the preferred frame for the speed of light, again not the observer's frame.

3. Experiments have established that it takes radio waves, bounced off satellites, from Japan to the United States, and then vice versa, longer to travel west to east compared to east to west. Yet again, this is consistent with an Earth–centered frame.

4. Experiments have also confirmed that radio waves, bounced from satellite to satellite around the globe, and then back to their origin, take a longer time traveling west to east as compared to east to west. Once more, this is consistent with an Earth–centered frame.

As a result, given the above supporting evidence, which theory is more consistent with reality? Is the preferred frame for the speed of light relative to the observer or else relative to the gravitational field? At least, for the author, the answer is obvious.

2.7   Global vs. Local Experiments (GRT vs. SRT)

The above four observations and experiments which contradict SRT are dismissed by the majority of today's physicists by invoking rotation and acceleration, then defined as the Sagnac effect and for that reason, still consistent with relativity (GRT), just not SRT. So where in the universe are there no fields of acceleration—solar systems, galaxies, or groups of galaxies? In the author's opinion, it is apparent that all of the objects of the universe are connected with fields of acceleration of some sort. In essence, within the universe, true linear inertial motion does not exist, because gravitational fields (acceleration) are universal.

This supposition eliminates true linear motion, moreover, leaves only the global experiments, which demonstrate that the speed of light is not relative to the observer, rather a function of the gravitational fields produced by mass (nonrotating inflow of space/ether).

For some inexplicable reason, modern–day physicists assume that only physically small linear experiments, such as the MMX, are the gold standard for determining whether or not the ether truly exists. **This is because they presuppose, with reference to these small experiments, that one can then disregard rotation (acceleration), as well as the curvature of the Earth since their effect is supposedly infinitesimal**. Essentially, they ignore the gravitational field. And for this reason, it is assumed they are not Sagnac experiments.

In contrast, all large global experiments by default must involve acceleration/rotation, as they exist within a spherical gravitational field generated by mass, and moreover, involve the Earth's rotation. Therefore, they are assumed to be a function of the Sagnac effect.

Principally, if only matter generates the preferred frame for light in a shape of a sphere (gravitational field) what other option is there? Technically speaking, there are no purely inertial frames.

Given the above, here is a crucial consideration. If it can be demonstrated, as presented in Chapter 3, that the MMX's null outcome (a small linear experiment) is also a function of the ether's existence, rather than purely a proof of its absence, thus indeterminate, then one is left only with the large global experiments.

So presuming this outcome can be proved, the global experiments, by default, represent the true reality. If this indeed is the case, the global experiments provide evidence, moreover, proof, that the speed of light is not relative to the observer but a function of the gravitation field or by the definition of this publication, the inflowing ether.

2.8   Conundrums Associated with PFGRT

There are some major glitches associated with both PFSRT and PFGRT, so obviously, as with all theories, they are incomplete. Now the better the theory, the closer it is to the ultimate reality of universe. Even so, we may approach the ultimate answer but may never quite get there. Listed below are three conundrums associated with PFGRT.

1. As the ether flows into matter, where does it go? A logical response is that if it enters into existence between the galaxies to produce the expansion of the universe, then as it leaves the universe, through matter, it goes to from where it came. This brings up the age–old question, where does the universe originate from, or more to the point, where do we come from? At present, both questions are unknowable; then again, perhaps there is an architect (creator).

2. Why does the inflowing ether (gravitational field) not rotate along with the Earth? Good question. Perhaps, it is anchored in another dimension (where it originated from and where it goes to). But this is a very poor and speculative answer.

3. How do the different inflows of PFGRT interact with one another (e.g., Sun vs. Earth)? This is one primary conundrum of this theory. There is a big difference as to how the inflow of the Sun interacts with a small object versus a large astronomical mass like the Earth, possessing its own independent inflow.

For example, with respect to large interacting astronomical objects, one inflow (Sun) must then interact with another inflow (Earth). But how does this transpire? Basically, the acceleration of the Sun's inflow must somehow interact at a right angle with the Earth's own intrinsic inflow. Otherwise, the Earth would not orbit the Sun. This is hard to envision, so it must be complex. Refer to Figure 2.24 below.
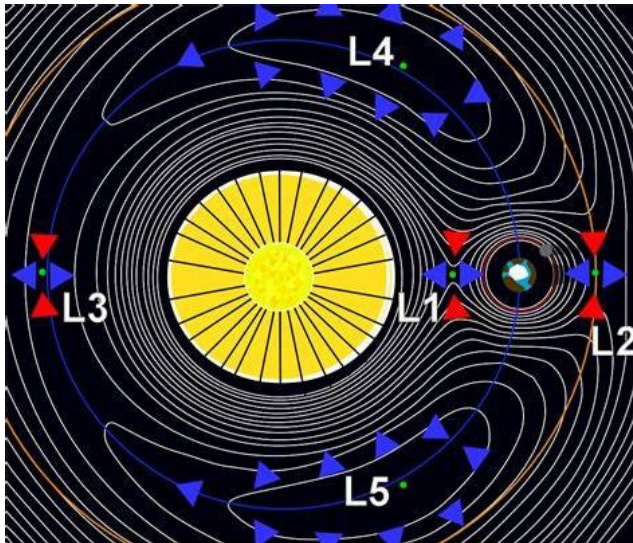
Wikimedia Commons

Figure 2.24   Lagrange Points Relative to the Earth's Orbit [Fair Use]

There are actually five Lagrange points. The one not discussed is located on the other side of the Sun relative to Earth (L3). It is not presented, because it is not part of this concept. However, this is the reason why they are numerically labeled as depicted above.

For instance, with respect to the Earth's orbit around the Sun, there are five Lagrange equilibrium points. Objects placed there, while in orbit around the Sun, maintain their position, relative to Earth. One is located radial, distal to the orbit of the Earth (L2). Another is sited radial proximal to the Earth's orbit (L1). These two positions are unstable, therefore, rapidly decay. There are two others (L3 is behind the Sun and not relevant to this discussion). One is located in front of the Earth's orbit, and the fourth follows the Earth's orbit, (L4 and L5).

Alternatively, these points are stable. Nevertheless, as shown in Figure 2.24, when an object is placed there, it exhibits a large elliptical orbit around a central Lagrange point. This function is depicted by the adjacent parallel ovals surrounding L4 and L5 as pictured.

Consequently, in order to account for these diverse observations, the Sun's inflow with respect to the Earth's inflow must be very multifaceted. One can visualize possible solutions, →such as classic eddy currents←, but they are complex, messy, and confusing. So, for now, this puzzle remains unsolved.

2.9   Conclusion

PFGRT posits a single preferred frame for the velocity of light, inertia/gravity, the "rate of time, and the perception of motion distance" which locally is the Earth's gravitational field (inflow of the ether). For the most part, both GRT and PFGRT produce similar outcomes but not identical. Nevertheless, the major advantage with reference to PFGRT is that it is simpler (Occam's razor), furthermore, more compatible with observed reality. But, perhaps, most importantly with the presumption of **the ether**, PFSRT, PFGRT, and QM can then be assembled into one overall unified theory as imparted in chapters 3 and 4.

For a somewhat analogous theory of inflowing space (ether), please refer to the publication given below written by Duncan Shaw.

On Maxwell's 1865 Theory of Aether: A Step Toward Unity
Physics Essays in its September 2020 issue (Vol. 33 No. 3)